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Author:

**Lockwood Trade Journal  
Co. (New York)**

Title:

**1690 - 1940**

Place:

**New York**

Date:

**[1940]**

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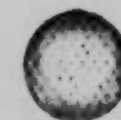
1690-1940, 250 years of papermaking in America. New York, N. Y., Lockwood trade journal co., inc. [1940]

1 p. l., 180 p. illus. (incl. ports.) diagr. 29½ x 22½".

Pages 136-180, advertising matter.

1. Paper making and trade—U. S.—Hist. I. Title. II. Title: 250 years of papermaking in America.

Library of Congress



TS1095.U6L6

[7]

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676.0073

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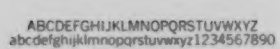
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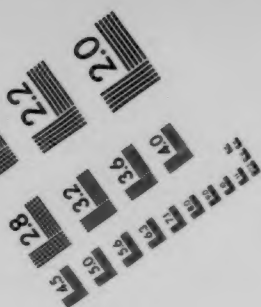
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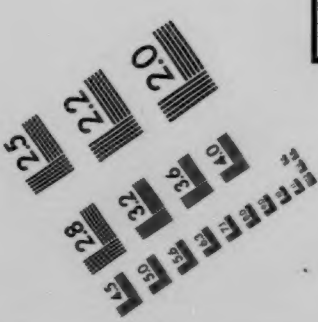
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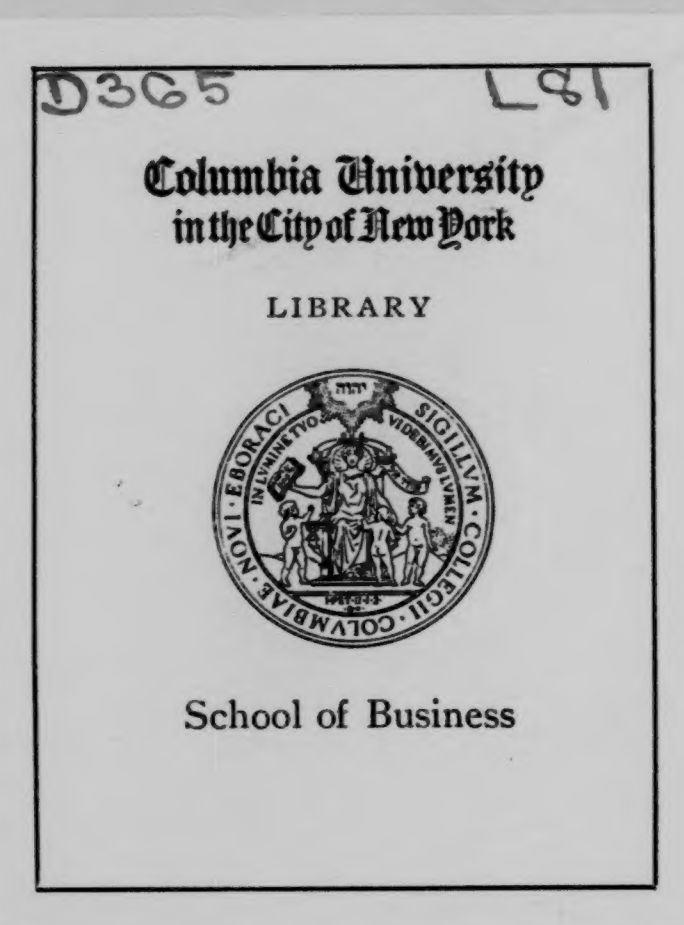






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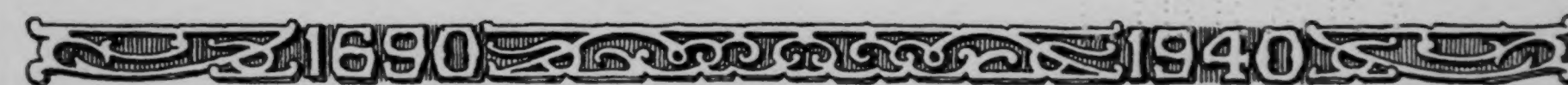
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*Published by*  
Lockwood Trade Journal Co., Inc.

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PAPER TRADE JOURNAL—LOCKWOOD'S DIRECTORY  
15 W. 47th St., New York, N. Y.

Price \$3.50







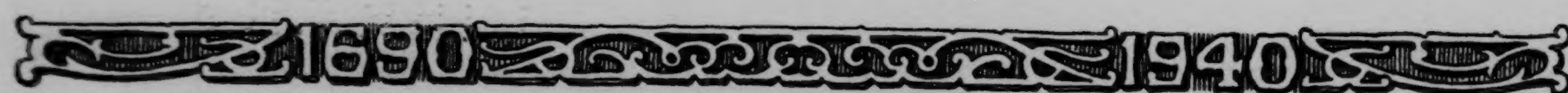
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## FOREWORD

In 1690, nearly a century before this country came into being as an independent nation, William Rittenhouse and three associates, Robert Turner, Thomas Tresse and Samuel C. Carpenter founded and operated the first paper mill established in the Americas and the location was in what is now Fairmount Park, Philadelphia, Pa.

In 1940, 250 years later, there are now operating in the United States alone 985 mills owned by 535 concerns. Each of these mills is immeasurably larger in production tonnage, and also in the variety and purposes of the paper produced by them, than the original Rittenhouse Mill.

At this writing, paper production is at its peak in variety, quantity, and quality of product and in the number of executive officers and owners of these producing mills and in the number of men employed therein and thereby.

Chemistry and machine builders have kept pace with the requirements of the enlargement of the demand, both in quantity and variety and have done their part and made possible the development of the industry and the variety of its product.

Paper is such a common thing that it is just "taken for granted." Few realize its tremendous importance to humanity.

PAPER IS THE MOST USEFUL AND MOST USED PRODUCT OF MAN. There is only one other identifiable thing in equally common use and that is fresh water and that is not a product of man.

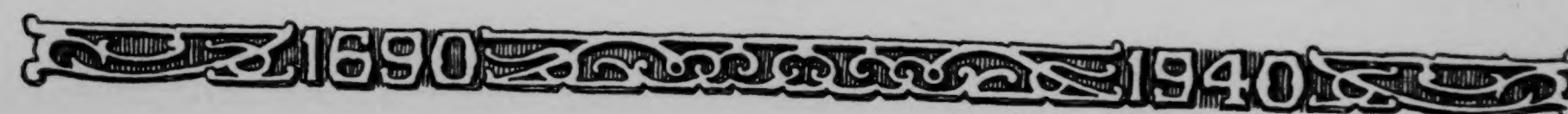
The variety of kinds and purposes of paper and paper products is so large and diversified that it is not possible to identify and record them individually herein. Suffice it to say that every act of civilized life entails the use of paper. All our records thereof, all our recorded history, all our recorded religions, all our evidence and proof of ownership of property or possessions, proof of birth, proof of citizenship, proof of death, bonds and mortgages and shares of stock, our deeds, etc., ad infinitum, are recorded on pieces of paper—our money itself is just paper—all our taxes are paid with pieces of paper, and so I say and claim that paper is the most useful and most used product of man and that the men who make it are all, each and every one of them undeniably USEFUL MEN.

PAPER TRADE JOURNAL presents in the following pages the record of 250 Years of Paper Making in America. No other periodical has ever attempted to publish in one of its regular issues the story and history of any of our major industries from the very birth thereof right down to the present. We include the complete roster, name by name, of all of our paper manufacturing concerns and the men that own and operate them.

PAPER TRADE JOURNAL does this same thing in identifying by name the men that joined with Rittenhouse in 1690. There were only four. Today in this issue we identify all the operating mills in this country and name 2000 useful men operating these mills. You can add to that number the many thousands of employees of these 985 mills and put each one of them on an honor roll of useful men, producers of mankind's most useful and most used product.

Geo. S. Macdonald

President Lockwood Trade Journal Co.  
and Publisher of Paper Trade Journal



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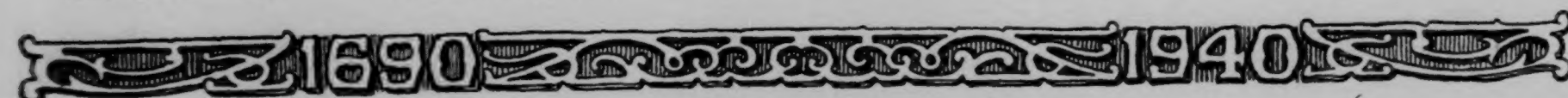


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## 250 YEARS of Paper Making In America

*A History of the Industry from the Times of  
William Rittenhouse*

By a Member of the Staff of the Paper Trade Journal

### CHAPTER I

## The Industry In Its Infant Stages

THE manufacture of paper was established in the United States in September, 1690. That was two and a half centuries ago. Beginning with a small mill which made paper from linen rags, the industry has grown to such large dimensions that today it ranks high among our industries and it is continually expanding. The value of the annual production of paper and paper products is now over a billion dollars. These products form the basis of the printing, lithographing, newspaper and many other industries yielding annually wealth of many billions and giving employment to hundreds of thousands of men and women.

Like most pioneering work, the development of the paper industries was slow and called for much tenacity on the part of the founders. Their struggles form romantic chapters of great interest.

Intellectual pursuits claimed the attention of few of the early colonists of the United States. They spent their days in physical labor clearing the land, hunting, fishing, trapping or cultivating the soil. They were compelled to exert their energies in catering to hu-

man wants—provided shelter, food, protection and clothes. Under these conditions there was no demand for the local printing of newspapers and books. Those who wanted such things could import them from Europe. Although some of the colonists had experience in European paper mills and they found abundant water power in the colonies, the entire lack of demand for paper caused them to follow other pursuits.

The demand for metals, bricks, terra cotta and other materials developed before the want of locally manufactured paper was felt. Iron ores were found in Virginia, Tennessee, Georgia, Massachusetts, New Jersey and elsewhere and small smelters were built in these states to manufacture iron. Lead, zinc and copper smelters were developed later. The articles made from these metals were of service to the physi-

cal wants of man. They helped in making farm machinery, wagons, stoves, tanks and a multitude of common objects. They are always the first basic materials new social units engage in manufacturing. Paper at least in the early years of a country's development, ca-



THE THIRD RITTENHOUSE MILL, BUILT PRIOR TO 1770.







ters to intellectual development. Even in large enlightened settlements these characteristics of metals and paper are found to develop similarly. Today the metal industries attract more attention and are more widespread than the paper industries. But there may be a change in the future. Some enthusiastic paper men are today dreaming of a paper age. Pointing to the growing increase of the use of paper and pulp in the arts they say: "Can we not legitimately visualize a time when we shall be dressed in paper clothing, sit on paper chairs around a paper table, drink tea and coffee from paper cups, use paper knives, forks and spoons, walk on paper floors, stairs and sidewalks and ride in paper cars and automobiles?" These are not extravagant dreams. They could be supplied to us today should we desire them. Many such articles are made now.

#### The First Newspapers

The first newspapers published in the United States appeared in 1700. A printers press was in operation in Boston in 1638. Just before 1700, pamphlets were printed in New York City, Philadelphia and Boston. It was a short step from pamphlets to books, although for many years after 1700 most of the books read in America were imported from Europe. The feeding of the intellect is always subsidiary to the feeding of the physical body. This is one of the lessons we learn from the history of the establishment of paper manufacture in America. Spiritual food follows the physical and paper's great service will be rendered when it caters to both the physical and intellectual man.

A suburb of Philadelphia was the cradle of the great paper industries in America. Twenty acres of land were leased by a syndicate of Philadelphia business men in September, 1690, just two hundred and fifty years ago. These pioneers were William Bradford, printer; Thomas Tresse; Robert Turner, real estate dealer; and Wilhelm Rittershausen, who changed his name to William Rittenhouse. The site of their first paper mill was Wissahickon Creek at a point about two miles above the junction of the Wissahickon with the Schuylkill River.

#### Bradford, the Promoter

Bradford was the promotor of the paper industry. He left London to establish a printing and publishing business in Philadelphia. He was a forceful character in addition to being a good scholar and printer. He published *Kalendarium Pennsylvaniense*, his first book one of the first books published in the United States.

Rittenhouse was the practical paper-maker. He came from a paper-making family that had been settled long in Mulheim, Germany. When in 1678 he took the oath of Dutch citizenship in Amsterdam he described himself as "Willem Ruddinghuysen van Mulheim, papermaker". Taking a new citizenship enabled him to aggrandize his name and calling. He was more than a gentleman papermaker. He was a clergyman in the Mennonite sect and became the builder of and the first minister of the Mennonite

church in Germantown, Pa.

The mill was small and successful from the start. Paper was made by hand from rags and it was of excellent quality. In 1697, Rittenhouse acquired the ownership. A flood destroyed the mill in 1701 and a new one was built near the site. Claus Rittenhouse, eldest son of the founder, acquired the ownership of the mill in 1708 on the death of his father. This made him the second paper-mill owner in America. He was born in Holland in 1666 and died in Germantown in 1734, having done much to develop paper making in this country. Father and son established and kept a fine reputation for their paper. It was always equal to the best manufactured in Europe. The mill supplied Bradford's Philadelphia and New York City printing establishments until years after Bradford passed away. As Bradford was the largest and most successful printer and publisher in America and was acquainted with the principal paper manufacturers in Europe, no better testimonial can be required than the simple statement that Bradford's paper was all supplied by the Wissahickon Mill. It showed that the earliest American book and writing paper was of unexcelled quality when such was called for. This supremacy has been continued until today when many of the finest papers manufactured are being made in our mills.

#### Man Made About 1½ Reams Daily

William Rittenhouse the third, erected a large mill below the Wissahickon mill. This mill was operated successfully until the close of the nineteenth century. The paper in this mill, and several others in the vicinity, was made by hand. It was in sheets 20 x 30 inches. A mill-man made about one and a half reams a day. The price of paper about 1729 varied between 5 and 14 shillings per ream. Writing paper cost 14 shillings, printing paper 7½ shillings and brown wrapping paper 4½ shillings per ream. Rags for paper making cost from 1½ to 2 pennies per pound.

The Rittenhouse family was closely associated with the paper industries for many generations and some of the businesses and mills they established are represented today by corporations engaged in the manufacture of paper on a large scale. We see in the history of the Rittenhouse family the natural aptitude of some members for a chosen industry similar to what has long been observed in the naval, military, diplomatic and medical professions.

#### Rittenhouse Came to America in 1688

William Rittenhouse arrived in the United States in 1688. He was a pastor of the Mennonite Church. Later in life he became the first Mennonite bishop in America. In addition to his theological work, Rittenhouse studied paper making in mills in Holland. He was astonished to find that no paper was made in the United States and no one knew how to make it. Realizing that there was an opportunity in establishing a plant, he looked around for someone to finance one. He was introduced to the publisher Bradford. This meeting would afford a subject for an historical painter. The paper maker who was intent on found-



ing an industry in America and an active publisher who long sought a paper maker. Fortunately, the two men agreed in their views and determined to build a mill. Articles of agreement were made. Robert Turner, Thomas Tresse and Samuel C. Carpenter, Philadelphia business men found the small amount of capital called for. Early in 1690, two years after Rittenhouse's arrival, the first paper mill was built on Paper Mill Creek, in Roxborough County, Pennsylvania. This was America's pioneer mill. Few who saw it visualized that it was the vanguard of the great mills of today and the first unit in a great and prosperous industry.

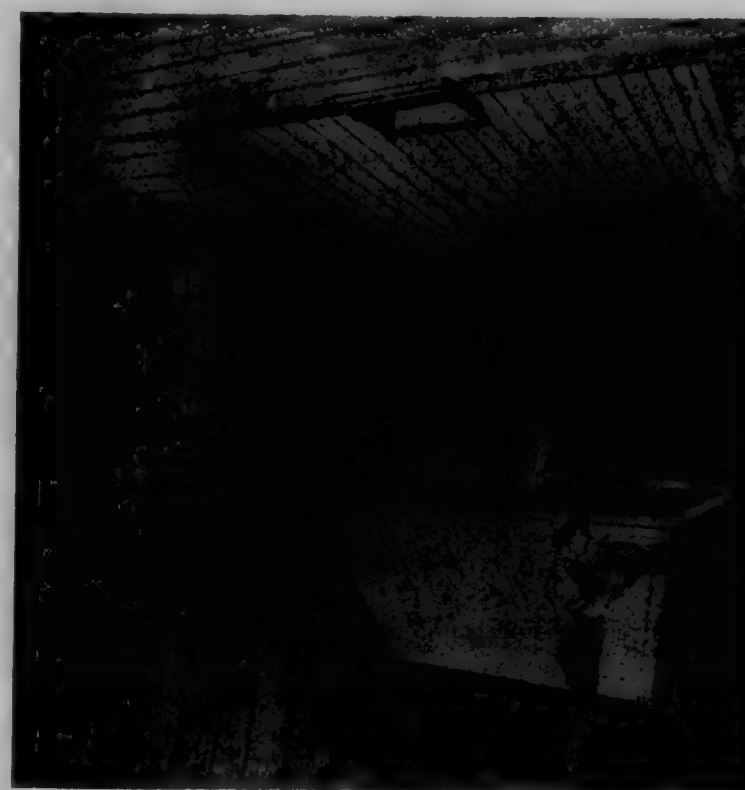
The Paper Creek Mill was worked by hand, employing four men. It made book, writing and news papers. The manufacturer's license gave the owners a ten years' monopoly on paper making. Flood waters destroyed the works in the following year. A new plant was soon built before the end of 1701.

#### Bradford Bought Whole Output

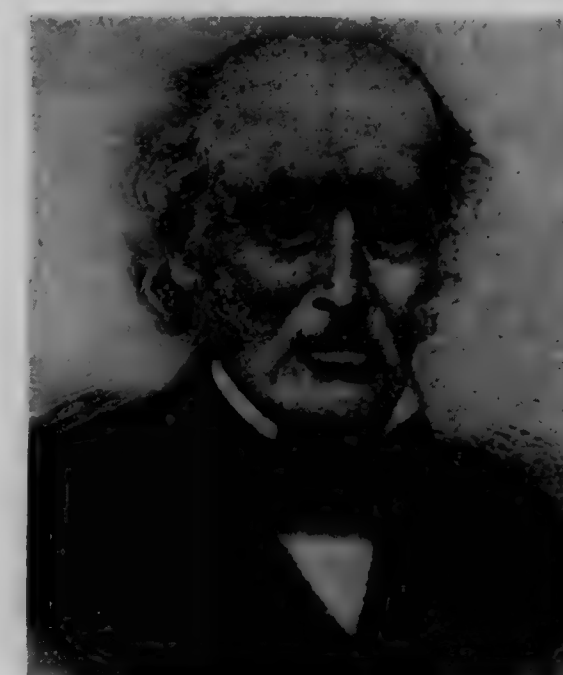
Bradford purchased the whole output of the mill. He was a book, magazine and newspaper publisher in Philadelphia with a large, active business.

The mill was built on a 20 acre land lot. The title was a lease for 99 years. Owing to the owner being absent in Europe, title was not issued until 1706. Rittenhouse was at that time sole owner and Bradford the sole consumer of the mill's output.

When the Rittenhouse monopoly expired at the end of ten years, in 1710, a second papermill was built by another Dutchman, William DeWees. The site was close to the first mill on Wissahickon Creek, Germantown, Pa. Thereafter, mills sprang up in many districts. The foundation of the paper industry having been set, the products being satisfactory to local consumers, progress was rapid. This year, the memory of Rittenhouse was recalled by celebrations



INTERIOR VIEW OF EARLY MILL FOR HAND-MADE PAPER.



DAVID AMES

and addresses by prominent residents of Philadelphia and Germantown.

#### Great Dearth of Rags

There was a continuous dearth of rags. The colonists were forced to live frugally and they kept their clothes as long as they held together. The result was that the greatest difficulties of paper makers were a chronic scarcity of rags. A New York paper mill published this advertisement: "The printer of this paper, having lately erected a paper mill at Hempstead Harbor, Long Island, N. Y. at a very great expense, the existence of which entirely depends on the supply of rags which at present are very much wanted, he, therefore, most humbly entreats the assistance of the good people of this province (New York) and city (New York) in particular, to assist him in the undertaking, which, if attended with success, will be a saving of some hundreds (of pounds) per annum to the colony, which has been constantly sent out of it for paper of all sorts, the manufacturing of which has but lately originated here; but should the public countenance the same it is more than probable that branch will be brought to considerable perfection in this place. The highest price will therefore be given for all sorts of linen rags by the advertiser." Thirty years later the same manufacturer advertised for rags and indicated that their scarcity was limiting the output of his mill.

About 1776 this advertisement appeared in Boston, Mass.: "The Bell Cart will go through Boston before the end of next month to collect rags for the paper mill at Milton when all people that will encourage the paper manufacture may dispose of them."

The prices paid for rags mounted and indicated the restrictions felt in the manufacture of paper. In 1777 the price paid for rags was three pence per pound; in 1778, eight pence; in 1779, twelve pence; in 1780, three shillings; and in 1781, ten shillings.





The price of rags was reflected in the price of paper. In 1787, when rags sold for twelve shillings a pound, paper sold for six pounds per ream. In 1780 it sold at eighty to one hundred pounds per ream. These were war prices and the pound was a colonial currency.

#### Business Conditions Unfavorable

Conditions were unfavorable at that period for a healthy industry. The price of paper was high and the quality was not always good although some mills produced excellent paper.

There were 100 paper mills in the country in 1800 and ten years later there were 200. They were located mainly in Pennsylvania, Maine, Massachusetts and Connecticut. They were small mills and all competed for the very limited supplies of rags. For over a century mill advertisements in the newspapers appealed for them.

Linen rags were the first raw materials used in the American paper industry. These became very scarce as the mills grew in number. Cotton rags were used later. Subsequently straw was used after experiments with grasses, cabbage stumps, corn husks and stems, nettles, ferns and a multitude of fiber plants showed they were unsuitable.

The straw pulp industry in America was made possible by a process discovered by Matthias Koops in England in 1800. He operated a mill using straw pulp which produced paper of good quality. William Magaw, of Meadville, Pa., designed a method similar to that of Koops in 1827. Magaw's patents were granted on March 8 and May 22, 1828. He established a mill which produced a strong and durable product which, while slightly tinted yellow, sold up to two dollars per ream, imperial size.

Magaw discussed his method of making pulp from straw with George A. Shryock, a prominent paper maker who operated the Hollywell mill at Chambersburg, Pa. Shryock was interested. He asked Magaw to supply his mill with pulp. He made paper from it and the *New Testament* and *Philadelphia Bulletin* were printed from it. The results impressed Shryock. He gave up using rags and employed straw pulps in his mill.

#### Shryock Develops Small Cylinder

Shryock developed a small cylinder machine which he claimed was the first to be used with straw pulp. In experimenting with binderboards and box boards he designed a grooved roll for manufacturing them. He spent \$35,000 in enlarging his plant and increasing his output. The prospects of straw pulp seemed so good to Mr. Shryock that he formed a new corporation and built a mill on the Conococheague Creek, near Chambersburg, Pa. after purchasing the rights to use Magaw's patents in the Eastern States. This mill was 150 feet by 50 feet and five stories in height. It produced 100 lbs. of paper per hour. This was the largest mill in the country until it was destroyed in July 1864 by Confederate troops under General J. A. McCausland.

Mr. Shryock was one of the most enterprising

paper makers of his day. He met with many successes as well as losses and, like all in the trade at this period he met with many difficulties. In speaking about his experiences with straw pulp he said: "It is not difficult to tell the history of the origin and progress of the manufacture of straw paper and boards. But who can tell of the toil, anxiety and mental agony endured for the first several years? In my life-long experiments I made paper of every description from straw—wheat, rye, barley, oats and buckwheat—corn-blades, all the grasses, corn-husks, white pine shavings, willow wood, refuse tan and bleached straw. As rags could be bought then for from two and one-half cents to four and one-half cents per pound, it would not pay to bleach straw." In those remarks one of the first references was made to wood pulp.

Magaw's straw pulp process was used for many years. In 1859, Palmer & Howland, of Fort Edward, N. Y., improved Magaw's patents. In the following year, Eben Clemo of Toronto patented means for pulping straw and grasses by treating them with nitric acid and an alkaline solution. Numerous patents were filed at this time for improvements on the Magaw and Clemo processes. The Tail & Holbrook patent, granted in 1863, was extensively used.

Some paper mills successfully used corn husks, the bark of various trees and palm leaves. It was mainly wrapping paper. The pulps from bark were never colorless.

#### Early Patents for Pulp

Early patentees for making pulp were: From beach grass, Isaac Sanderson, Milton, Mass., in 1838; corn husks, Burgess Allison and John Hawkins, Burlington, N. J., 1802; leather shavings, Joseph Condit, 1801; John McThorndike, 1814; rags and straw, and corn husks to be mixed with rags, John W. Cooper, Washington, Pa., 1829; sea grass, Elisha H. Collier, Plymouth, Mass., 1828; sea weed, Samuel Green, New London, Conn., 1809; corn husks, Homer Holland, Westfield, Mass., 1838. Patents were granted for the use of sorghum, Spanish grass, reeds, beets, ivory shavings, rope, canvas, corn stalks, corn cobs and cotton stalks.

In Louisiana, in 1800, an exhibition was shown of paper made from bagasse, cotton stalks, wild indigo, banana fibers and several other fiber plants grown near New Orleans. The paper was, in many cases, colored variously. The exhibits showed paper of fine quality running from white writing paper to different classes of wrapping paper.

There was a constant experimenting to find the best materials for paper pulp in the early days of the industry in the United States. The ideal substance was not found. This groping after a good, cheap easily worked material of the pioneers resembled the search of early man for writing material.

Man, being an extremely social being, at a remote period experimented to find materials for receiving symbols. The bark of trees, soft woods and other



substances were used. Drawings were made on rocks and in caves. Then bricks, tiles and ceramic cylinders were used. Leather, parchment and paper made from papyrus reeds growing in the Nile were used in paper making in Egypt at an early date. Paper was made in China long before the Christian era. The Saracens introduced the Chinese and other Oriental methods of paper manufacture into the Arabian countries and Spain. From Spain it was taken to France, Italy, Austria and Germany. Finally it was carried to England and Holland. These two countries, the last in Europe to establish paper industries, later led the world in its processes. The Moors made paper in Spain in 1150, the French in 1189, the Germans in 1320 and the English in 1400. It was nearly three centuries after England began the manufacture of paper when William Rittenhouse laid the foundation for the industry in the United States. America was a laggard, too, like England and France and like these two countries, America was destined from a small, slow start to develop the greatest industry in the world as well as to lead in processes, machinery and materials.

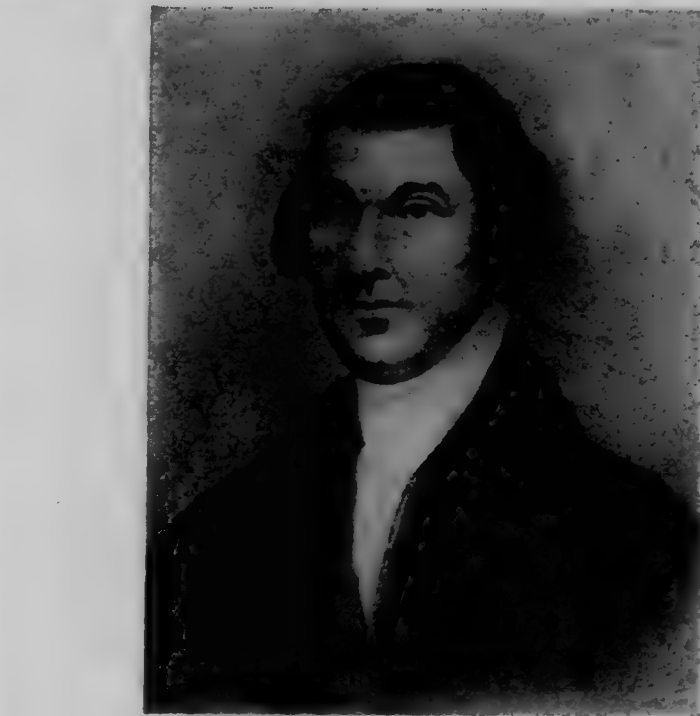
The rag papers of the early days were made by hand. The process was slow and comparatively costly. The need was felt for speedier means for pulping. The first improvement took the form of a pestle and mortar. This was improved so as to become a battery of stampers or hammers driven by water power. Then three batteries were joined so that a single revolving shaft operated the stampers. The first battery had coarse iron teeth, the next fine teeth and the last strong unshod hardwood. Washing continued through the first two batteries. The sheet was dipped into the mixture of fiber and water in the third battery of beaters and finished by hand. This procedure continued into the eighteenth century.

#### Dutch Introduce the Hollander

The Dutch have the honor of introducing the next important invention, in 1750 a cylinder beater, called



THE ECKSTEIN MILL, MANAYUNK, PHILADELPHIA



DANIEL VOSE

the Hollander. It was an oblong tub with a metal shaft fitted with iron knives acting against an iron bedplate. The knives tore apart the rags which were quickly pulped. The first Hollanders were brought to the United States in 1775 and they were later adopted widely in this country. The principle of this machine, in greatly improved form, is still employed in the industry.

The next revolutionary invention, the principle of which is still dominant in the industry, was the Fourdrinier machine. It was made to relieve paper-makers from finishing sheets by hand. The first machine was invented and patented in France in 1779 by M. Robert. The inventor was unsuccessful in securing purchasers in France and he visited London and sold his rights to the prominent firm of stationers, Fourdrinier Brothers. Robert's machine was as simple as it was effective. It matted the fibers by carrying the pulp over an endless traveling wire belt in such a manner that the water drained away through the wire and left the fibers flat and dry. John Gamble patented improvements in Robert's machine in England in 1807. Machines of this type were purchased by Americans in 1827. Our manufacturers were then in a position to abandon hand work and to speed up their paper output while increasing its quality. They were also enabled to remove all restrictions of the sizes of sheets.

American papermakers were now furnished with machinery capable of producing paper in any quantity and quality. They had entered the machine age. Their next move was to introduce a new pulp which rapidly revolutionized the industry, opened up vast fields for distributing paper and by reducing costs, enlarged the scope of paper's usefulness. The passing of thousands of years was required before the machine age was attained. Then the industry made extraordinary strides.





## CHAPTER II

# Other Paper Mills of Colonial Times

THE early paper mills were established in Pennsylvania. They were engaged in meeting local paper needs. There was a demand for paper in the provinces and gradually mills were erected in other eastern districts. Progress was restricted by difficulties in securing capital, skilled labor and rags. Trouble was experienced in securing tools, presses, vats and moulds. This made production costs high and resulted in dear paper.

The printer Bradford, petitioned the New York general assembly, on July 6, 1724, to allow him to have introduced into the council a bill to secure to him a monopoly of paper making for a period of fifteen years in the province of New York. This bill was rejected. Bradford moved his plant to Elizabeth, N. J., where, in 1728, he purchased a mill which he and his son Andrew Bradford operated successfully until about 1740.

The New England colonies having ample water power were ideal for the paper industry. Bostonians realized this and led by Daniel Henchman a syndicate was formed in 1728. Permission to engage in industrial work at that time had to be secured from the government. A new industry was looked upon as a public utility and had to be passed upon by a board corresponding to the public service commission of today. The granting of authority was given in a majestic legal document like a railroad charter.

### Encourage Paper Manufacture

The Massachusetts charter granted to Henchman and his associates was worded as follows:

An Act for the Encouragement of Making Paper. "Whereas the Making Paper within this Province will be of Public Benefit and Service; But inasmuch as the Erecting Mills for that purpose and providing Workmen and Materials for the Effecting that Undertaking will necessarily demand a considerable Disburse of Money for some time before any profit, or gain can arise there-from; And whereas Daniel Henchman, Gillam Phillips, Benjamin Faneuil and Thomas Hancock, together with Henry Dering, are willing & desirous to Undertake the Manufacturing Paper; Wherefore, for the Promoting so beneficial a Design;

"Be it Enacted by His Excellency the Governour, Council and Representatives in General Court Assembled, and by the Authority of the same, That the sole Privilege and Benefit of making Paper within this Province shall be to the said Daniel Henchman, Gillam Phillips, Benjamin Faneuil, Thomas Hancock and Henry Dering, and to their Associates, for and during the Term of Ten Years from and after the Tenth Day of December next ensuing: provided

the aforesaid Daniel Henchman, Gillam Phillips, Benjamin Faneuil, Thomas Hancock and Henry Dering, shall make or cause to be made within this Province, in the space of Twelve Months next after the Tenth Day of December, next, Two hundred Rheam of good Merchantable Brown Paper, and Printing Paper, Sixty Rheams thereof at least to be Printing Paper, and within the space of Twelve Months then next coming, shall cause to be made within this Province Fifty Rheam of good Merchantable Writing Paper, of equal goodness with the Paper commonly stampd with the London arms, over and above the aforesaid Two Hundred Rheam of Brown Paper, and Printing Paper.

"AND further, That the aforesaid Daniel Henchman, Gillam Phillips, Benjamin Faneuil, and Thomas Hancock, together with Henry Dering, proceed and make Twenty-five Rheam of finer & better Writing Paper in this Province, as aforesaid, at or before the Tenth Day of December, which will be in the Year of Our Lord One thousand seven hundred & thirty-one and continue to make the Quantities and Species of paper before Enumerated in the aforesaid Two Years, and that they make or cause to be made within the space of Twelve Months, from and after the said Tenth of December 1731. Five hundred Rheam of good Merchantable Writing and Printing Paper, One hundred and fifty Rheam thereof at least to be Writing Paper, and continue to make the like Quantity of Five hundred Rheam, as aforesaid, every Year, for and during the remaining part of the said Ten Years; and if any person or persons shall make any Paper within this Province, without leave first had and obtained from the said Daniel Henchman, Gillam Phillips, Benjamin Faneuil, Thomas Hancock and Henry Dering, he or they so making the same shall pay Twenty Shillings for every Rheam of Paper Manufactured in this Province, as aforesaid; One half of the said Twenty Shillings to be to and for the Undertakers Daniel Henchman, Gillam Phillips, Benjamin Faneuil, Thomas Hamilton and Henry Dering, and their Associates; the other half to the use of the Poor of the Town where the Paper shall be exposed to sale, or brought and found, to be recovered by the said Undertakers, by Bill, Plaint or Information in any of His Majesties Courts of Record within the County, where the offence shall be committed, or before any Justice of the Peace in the same County where the forfeiture shall not exceed Forty Shillings."

### Became Celebrated Men

The incorporators of the Milton Mill, on the Neponset River, became celebrated men. Hancock became one of Boston's wealthiest men. He was un-

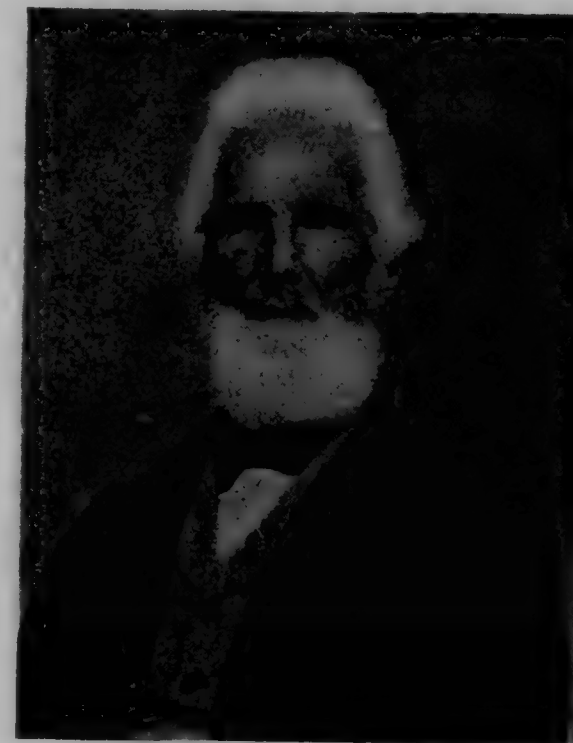


cle of John Hancock of the revolutionary period. Faneuil, Phillips and Dering, established families that are represented in New England today. This firm had a monopoly of the paper trade in Massachusetts until 1738. Thereafter numerous small mills were built in several parts of the province.

The Civil War caused a shortage of paper and prices advanced so high as to offer a premium on paper manufacturing. Numerous mills were built and were prosperous between 1860 and 1865. Then a reaction was experienced and prices slumped so badly that most of the mills were forced to close. In 1860, there were in operation along the Charles River, the Foster, Wales & Mills, Rice & Garfield, the Crehore and Curtis paper mills.

A mill was operated at Newton Lower Falls, on the Charles River, in 1790, by John Ware, an officer in the Revolutionary war. Walter Ware, his son, went to Canada and built the first paper mill there in 1804. It was erected at St. Andrews in Quebec.

The Ware Mill was sold on October 7, 1815, to a group of men who became famous in New England paper manufacturing history. It included William Hurd, John Marston, Charles Jackson and Charles Bemis. The Ware Mill was carried on through many difficulties occasioned by political and business conditions of the time and in October, 1823, William Hurd became sole owner who carried it on until 1825 when he admitted to partnership Lemuel Crehore, a man who became a famous industrialist in New England. The mill was enlarged and furnished with improved machinery. On October 15, 1834, Hurd sold his interest to Crehore. On July 26, 1836, Crehore engaged in partnership Benjamin Neal and the firm became known as Crehore & Neal. It built up a large business. In 1845, the firm was dissolved. At this time the mill operated four 32 inch beaters, a 62 inch Fourdrinier machine and a 36 inch Cylinder machine on book paper. The



GEORGE W. KNOWLTON



SUNNYSDALE PAPER MILL

products of the mill were newsprint, writing and book papers, wrapping paper and cardboard. In later years the mill was operated by Lemuel's son, George Crehore under the firm name of L. Crehore and Son. In 1867, Dr. Charles Frederick Crehore, a distinguished surgeon in the Civil War, in which he was Surgeon-in-Chief of the Army, became a partner and assumed the management of the mill until 1919 when he died. The mill was then sold after being operated for nearly a century by one family. Many other mills were carried on by the descendants of pioneer paper-making families.

The Curtis family was as well-known as the Crehore. Solomon Curtis, its founder, built a mill on the Charles River in 1790. In 1792 he purchased an interest in the Ephraim Jackson Mill. In 1799, after several changes had been made in the partnership, Curtis and Simon Elliott acquired the property. Curtis bought out Elliott on April 3, 1804 and the name of the plant was changed to the Curtis Mill.

Allen and William Curtis, sons of Solomon Curtis, purchased the mill in 1831. They equipped it with new machinery and, in 1834, built a new stone factory, which is still standing. Curtis Brothers made news, writing and book papers. They made, for a local bank in 1820, bank note paper permeated by matted mohair threads. This was probably the first paper of its kind made in the United States. This business was carried on successfully until the Civil War when the general business depression caused the mill to be closed down. After the war it was sold to the Cordingley Company and used as a wool-extract plant.

### Famous Families Operate Mills

Wales & Mills were important paper manufacturers on the Charles River between 1843 and 1873. This plant was at different times later operated by the Curtis, Jackson, Rice, Garfield, Bigelow, Parker, Hurd, Stevens, Hooker, Nichols and other famous families. It was burnt down half a dozen times, on each occasion the plant was rebuilt in larger and better-equipped forms. The last fire was in 1894. The associations of the leading paper-makers of the district with this mill serves as another illustration of the fact, often observed, that once in paper, men are prone to continue in it generation after generation. Many present day descendants of





the above and other New England families are engaged as paper brokers, distributors and factors in many cities.

Samuel Babcock built and operated a paper mill in Springfield, Mass. This was the first mill to operate in the district. Eleazer Wright was the next to build a mill in Springfield. This mill, built in 1788, subsequently became famous as one of the early properties of the Ames family of manufacturers.

David Ames, an officer of the revolutionary army, in Washington's second term, was sent to Springfield to build a national armory. Colonel Ames arrived there in 1794 and built the armory. He was its superintendent during the next eight years. In 1802, he acquired the Babcock mill which he improved. His sons, David, Jr. and John, became partners in 1820 and their enthusiasm for the business caused it to forge ahead. John Ames was mechanically inclined. He invented improved machinery and continually made improvements which benefitted the whole industry. The firm became known as D. & J. Ames after the retirement of Colonel David Ames. In 1815, the Ames's purchased the Bowman & Cox Mill, established in Chicopee, Springfield, in 1806. They enlarged the mill and equipped it with new machinery. This mill was in continuous operation for nearly half a century. Its last proprietor was John Valentine.

#### Ames Brothers Introduce Loading

When the Ames brothers took over their father's mills, there were at one time five of them, a method of loading or weighting paper with lime sulphate had been discovered by some English manufacturers. The Ames's introduced the practice into their mills. One of their foremen gave this interesting account of their method. "There was an old gypsum mine near their Water Shops mill in Springfield. This they mined and crushed with a crude grinder and, after screening a little, wheeled it to the side of the beaters and shovelled in all they thought the stuff would carry. One of the effects of this kind of pulp was to make the paper quite gritty, almost like very fine sand paper. The old cylinder machine with one large fire drier was run about twelve hours per day and during this time the gypsum would accumulate on the drier so thick that very little heat could get through it. A good strong scraper was then employed to clean it and the machine was ready to go ahead again."

The above description shows a sidelight on the crudeness of some of the operations in paper mills of the period. There was no intense competition in distribution at the time and most mills had regular customers for their products. Not only was paper of poor quality produced some times, but other censurable practices were indulged in. Various grades of paper were made from the same stock by the same processes. When book or newspaper was selling around nine and ten cents per pound, it was not uncommon for some mills to cut it up and sell

the same paper as writing paper at eighteen to twenty cents a pound.

The panic of 1837 caused many mills to fail. The Ames's failed and they never secured another mill. David Ames died on August 6, 1847, aged eighty-seven years. David Ames, Jr., died on March 12, 1883, aged ninety-two and his brother John Ames died on January 25, 1890, at the age of ninety.

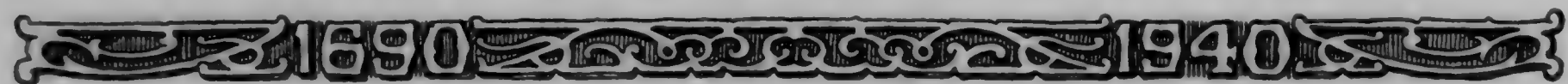
In 1779, the residents of Pittsfield, Mass., seeing how small paper mills operating in many localities in Massachusetts, gave employment to many people, wanted a mill established in their village. They petitioned the General Court in Boston to use their "best endeavors, that any petition which may be preferred from Pittsfield, or from any individual of it, respecting the erecting of a paper mill in the town, be attended to by you in the General Court." Some years passed before this petition resulted in action.

#### Crane Family Comes on Scene

The Crane family now came on the scene. Zenas Crane, of Canton, Mass., a village near the Milton paper mills, where he learned the trade, was attracted to the Berkshires on account of its excellent water power, and other advantages. In partnership with John Willard, he started a mill in Dalton, in 1801. At the end of the year Daniel Gilbert purchased Willard's interest and the firm became known as Crane & Gilbert. They made book, news and writing paper. The mill products were marketed in Albany, N. Y. Crane left the firm in 1807, and in 1809, he returned to papermaking and acquired the mill which later became famous under the name of Crane's Old Red Mill. Mr. Crane operated this mill until 1842. He died in 1845.

Zenas M. Crane succeeded to the mill on the death of his father. Under him it became very prosperous. At his death he was able to bequeath a large fortune to his youngest son, Winthrop Murray Crane who took over the ownership and management of the mill. Success attended his efforts and Crane papers became the best sellers on the market. Winthrop Crane was born in Dalton, Mass., on April 23, 1853, and died there on October 2, 1920. He was a politician as well as industrialist and became the most widely known member of his family. He spent forty years in politics and among many public offices he was Lieutenant-Governor and Governor of Massachusetts and Senator from his native state. He was a popular man and a hard worker. Calvin Coolidge held the opinion that Winthrop M. Crane: "Inspired love in all who knew him. In the affection of his fellow men, he stood first in Massachusetts. It is no doubt a commonplace to say our Commonwealth will never be the same without him, but his loss will be felt in a way that will not be commonplace."

The paper trade knew him as a worthy rival, a vigorous worker and a loyal associate who was respected alike by labor in his mills and the officials in

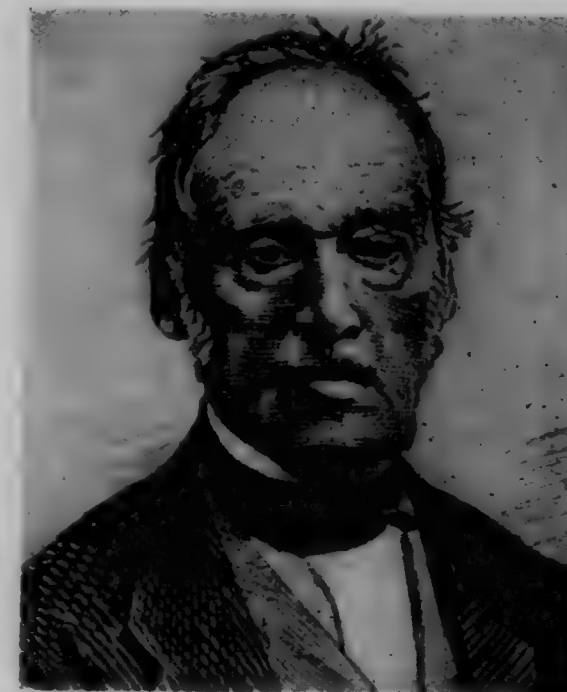


his offices. He was a master of the paper business, having in his youth served a working apprenticeship in every part of it. At his death it was said of him that: "His farsightedness and industry built up a perfect business structure which will prove a fitting monument to him for many years to come."

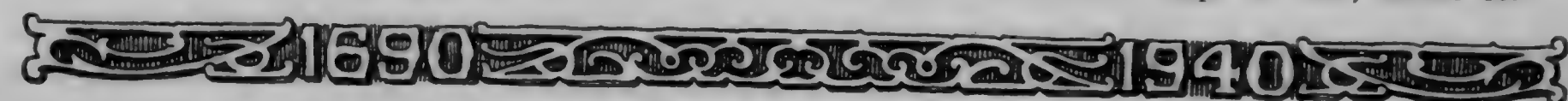
The Nehoiden Mill was established on January 13, 1794, by Stephen Crane, the elder brother of Zenas Crane, and Edward Jackson, Joseph Greene and William Hoogs. This famous mill changed ownership many times in its long career. In 1866 it was operated by Joseph G. Loring & Co. who made paper from esparto grass. In 1867, B. S. Binney & Co. made paper bags. In 1868 it was destroyed by fire. Binney & Co. rebuilt the mill and operated it until 1870 when Charles Francis and later R. T. Sullivan converted it into a woolen mill. It has continued in the wool business since. Many of the pioneer paper factories found in their old age service in some branch of woolen manufacture.

In 1825 there were about twenty-five small paper mills in Massachusetts and several in Connecticut in operation. Starting in Pennsylvania, mills were built wherever newspapers of large circulation were established. The building of mills followed the local demands for paper for two reasons. The first was cheapness of distribution. No high transportation charges had to be met. The other reason was equally practical. Local mills were able to supply paper continuously. There were no publication delays through newspapers running out of paper stocks. Paper mills and newspapers have always been closely associated.

There were about 100 paper mills in the United States at the beginning of the nineteenth century. From 1800 on, they increased rapidly. It was estimated that in 1830 there were over 150 mills, but statistics were not then on a scientific basis. The House of Representatives in Washington on June 7, 1809, called upon the Secretary of the Treasury, Albert Gallatin, to report on the manufacturing in-



JOHN AMES



ZENAS CRANE

dustries of the country. He discovered endless difficulties in securing information. His report, filed a year later was most incomplete. He could do little with the paper makers. He reported that: "Some foreign paper is imported still, but the greater part of the consumption is of American manufacture; and it is believed that if sufficient attention were everywhere paid to the preservation of rags, a quantity equal to the demand would be made in the United States. Paper mills are erected in every part of the Union. There are twenty-one in the states of New Hampshire, Vermont, Rhode Island and Delaware alone and ten in only five counties of the states of New York and Maryland. Eleven of the mills employ a capital of two hundred thousand dollars and one hundred and eighty workmen. They make annually one hundred and fifty thousand dollars worth of paper. Statistics are difficult to gather. The manufactures of hanging (wall) paper and playing cards are also extensive."

#### The First Census of Manufactures

Gallatin's report showed the need of a census of manufactures and in the same year, 1810, a census was begun. The first census was no improvement on Gallatin's Report. The returns, through the lack of skill of the marshals collecting data and the reluctance of manufacturers to give facts about their operations, made the first census irregular, deficient, erroneous and unreliable.

J. L. Bishop in his History of American Manufacturers, published in 1868, gave this picture of the deficiencies of the first census: "The number of printing offices—given by Isaiah Thomas, a competent statistician, at more than 400 in 1810—were returned by the marshals as 110. Bookbinders, calico printers and dyeing establishments were returned for one state only. No glass works were returned for Massachusetts, which had long made and exported glass of a superior quality to other states. Bark mills were given for only one state; carriage makers for three; blacksmith's shops for five; hatters for



four; tin and copperware shops for two—and these the least considerable.”  
A census of that character was better than none. Congress retained Tench Coxe of Philadelphia, economist and statistician, to analyze the census returns and to place them in order. He reported to Congress in June, 1813. His report is the first understandable account of American manufactures made up to that date. It became the style-sheet for several subsequent census reports.

Paper Products Estimated at \$1,939,285

The first census showed that the value of all manufactures in the United States was \$127,694,602 in 1810. Paper, pasteboard, cards and other paper products were estimated to be worth \$1,939,285 annually. Mr. Coxe, as a result of his own investigations, increased the census returns by a little over 35 per cent. This gave the paper industries an annual value of \$2,600,000. This amounted to a little more than two and one-half per cent of the total value of manufactures.

The following interesting figures for paper were given in the Coxe report:

States, Territories and Districts	Mills	Reams	Value of Product
Maine	2	4,500	\$16,000
Massachusetts	23	95,129	290,951
New Hampshire	6	14,625	42,450
Vermont	11	23,350	70,050
Rhode Island	3	14,625	53,297
Connecticut	19	77,756	82,188
New York	28	10,380	232,268
New Jersey	14	165,981	49,750
Pennsylvania	64	22,200	626,749
Delaware	9	3,000	75,000
Maryland	4	6,200	22,400
Virginia	4	2,400	10,000
Ohio	2	6,200	18,600
Kentucky	6	2,400	6,000
North Carolina	2	.....	15,500
East Tennessee	1	.....	.....
South Carolina	1	.....	.....
District of Columbia	1	.....	.....
	202	425,521	1,689,718

More than half the mills are seen to be situated in Pennsylvania, the pioneer and still the most im-



C. H. DEXTER

portant state, in Connecticut, New York and New Jersey.

A More Complete and Accurate Report

In the same year Isaiah Thomas made an independent study of the paper industry and made a more complete, more accurate and valuable report. He wrote:

“My endeavors to obtain an accurate account of the paper mills in the United States have not succeeded agreeably to my wishes, as I am not enabled to procure a complete list of the mills, and the quantity of paper manufactured in all the states. I have not received any particulars that can be relied on from some of the states; but I believe the following statement will come near the truth. From the information I have collected it appears that the mills for manufacturing paper are in number about one hundred and eighty-five (sic), viz.: in New Hampshire, 7; Massachusetts, 40; Rhode Island, 4; Connecticut, 17; Vermont, 9; New York, 12; Delaware, 10; Maryland, 3; Virginia, 4; South Carolina, 1; Kentucky, 6; Tennessee, 4; Pennsylvania, about sixty; in all other states and territories, say 18. Total 195, in the year 1810.

“At these mills it may be estimated that there are manufactured annually 50,000 reams of paper, which is consumed in the publication of 22,500,000 newspapers. This kind of paper is at various prices according to the quality and size, and will average three dollars per ream; at which this quantity will amount to 150,000 dollars. The weight of the paper will be about 500 tons.

“The paper manufactured and used for book printing may be calculated at about 70,000 reams per annum, a considerable part of which is used for spelling and other small school books. This paper is also of various qualities and prices, of which the average may be three dollars and a half per ream, and at that price it will amount to 245,000 dollars and may weigh about 630 tons.

“Of writing paper, supposing each mill should make 600 reams per annum, it will amount to 110,000 reams, which at the average price of three dollars per ream will be equal in value to 333,000 dollars, and the weight of it will be about 650 tons.

“Of wrapping paper the quantity made may be computed at least at 100,000 reams, which will amount to about 83,000 dollars.

“Beside the preceding articles, of paper for hangings, for clothiers, for cards, bonnets, cartridge paper, pasteboards, etc., a sufficient quantity is made for home consumption.

“Most of the mills in New England have two vats each. Some in New York, Pennsylvania, Delaware and Maryland have three or more. Those with two vats can make, of various descriptions of paper, from 2,000 to 3,000 reams per annum. A mill with two vats requires a capital of about 10,000 dollars, and employs twelve or more persons, consisting of men, boys and girls, collecting rags, making paper, etc., may be said to give employment to not less than 2,500 persons in the United States.

“Some of the mills are known to make upwards of 3,000 reams of writing paper per annum; a few do not make any; but there are not many that make less than 500 reams. The quantity of rags, old sails, ropes, junk, and other substances of which various kinds of paper and pasteboards are made, may be computed to amount to not less than three thousand five hundred tons yearly.”

Industry Shows Primitive Condition

This report shows the primitive conditions of the industry in the early part of the nineteenth century. America was at war with Great Britain and, while the demand for paper was good, the raw materials were scarce. Newspapers of the period carried advertisements for rags, rope and other materials. In the light of our present knowledge, it appears ironical that there was a material shortage in a land of abundant forests. It is an indication of how, when knowledge lingers, industry may languish. The paper industry has experienced similar difficulties at various times.

Though business conditions were hard during the war, some Americans were of good heart as the following views of a New Haven newspaper editor testified. He had purchased in New York a supply of newsprint which was shipped by the packet “Susan.” The packet was captured by a British naval boat and the paper had to be ransomed by a fee which almost amounted to its cost. The editor wrote as follows:

“Our Patrons must pardon us for giving them a very inferior quality of paper this week. Fortune has frowned upon the printer, and placed in the hands of the enemy, by the capture of the “Susan,” our stock of paper for several months, worth between 200 and 300 dollars. It will be obtained, however, by paying nearly its value over again. Our friends who are in arrears at this office, it is hoped, will remember not to forget the publisher at this time.”



AMERICAN WOOD PAPER CO., ROYER'S FORD

This heart to heart talk appears naive today. It reflects a different ethical and business age when men placed trust in each other. The amount of paper consumed by the New Haven Columbia Register in 1814 serves as a measure of business activities in Connecticut at that time.

Rag Scarcity a Continuous Handicap

Fears inspired by the war, the disruptions it caused in business, the lack of confidence in the future, transportation and financing difficulties, dejected business men. Some of them attributed their troubles to imports. Their complaints led to demands of Congress from all parts of the country for the prohibition, or heavy taxation, of all foreign goods imported. In 1816 and 1818 tariff acts were applied, but failed to give relief. There was a business panic in 1819 followed by a severe depression. The Society of Paper-Makers in 1820 memorialized Congress for a higher duty on imported paper. They asked for a tax of twenty-five cents per pound on all imported writing, book, news and copper-plate papers and fifteen cents per pound on all others. They succeeded in getting higher duties, but the scarcity of rags plagued them until nearly the end of the century.

CHAPTER III

The Use of Papermaking Machinery

AFTER the foundation of the paper industry in Pennsylvania and the New England states, New York developed numerous small mills. Later, mills were established in Northern, Southern and Western districts. In Mr. Coxe's census of manufactures published in 1813, there were 200 paper mills in operation. Of 64 were in Pennsylvania, 28 in New York, 19 in Connecticut, 11 in Vermont, 23 in Massachusetts and smaller numbers in Delaware, Maryland, Virginia, Kentucky, North and South Carolina, Tennessee and Ohio. Paper was made wherever there were important newspapers.

Nathaniel Rochester was the pioneer in paper making in New York. He erected a mill in Dansville,

Rochester was a native of North Carolina and a friend of President Washington. He was in the national army during the Revolutionary War. In 1810, he retired from the army, went north to New York and embarked in paper manufacturing. The mill was small, business conditions were difficult and Colonel Rochester had other interests. He sold the mill to local men in 1814. This mill attracted attention and in a few years numerous other mills were built in Dansville.

A Famous Mill Described

The Eagle Mill, built in Dansville in 1824 by Andrew Porter, became famous and continued in





operation for nearly a century. A reporter visiting it in its ninetyeth year gave this description of the old plant:

"The machine on which the paper is made is said to have been built by a local wheelwright, a slender wooden affair of barely twenty feet in length and thirty-six inches in width. The entire plant is operated by water-power, its huge, old wooden waterwheel creaking noisily under its ceaseless burden. The dam, from which the water is drawn, is one of those old-fashioned affairs which, owing to the scarcity of the supply, exposes shamelessly its structural features to the public gaze. A wooden flume, perched above the ground upon scantling supports, carries the water to the mill, a hundred yards distant, leaking copiously all the way. There are two beaters, each of a capacity of about two hundred and fifty pounds, located in the loft, and the pulp runs into a vat below, from which it is pumped up to the machine.

"The machine is in every way singularly deficient in labor-saving devices. The pulp is carried on a blanket instead of a Fourdrinier wire, which permits the water to percolate through. There are but four small heated cylinders, instead of the huge batteries of driers seen on even the smallest of modern machines. There are neither suction boxes, calendering rolls nor cutting disks, and the water, as it is pressed from the pulp, is permitted to drip about the machine with heedless prodigality.

"The reel on which the paper is taken off is a rough, wooden spindle affair, regulated in its action by iron weights on the end of a rope. A stop-gauge guillotine cutter takes it from the roll, and the operator, at his leisure, cuts it to size, sheet by sheet. If it is required to cut the paper to a smaller size, it is folded and torn apart over a scythe blade attached to the wall. The mill is said to have a maximum capacity of two thousand pounds for twenty-four hours, but, as it is operated throughout by one man, the output is probably considerably less than half a ton a day."

Fire destroyed this mill on January 8, 1914, just before the World War and it has not been rebuilt. The machinery in this mill was similar to that in use in a majority of the country's small plants. It was astonishing that, with so much inventive talent in America, the paper industry delayed long in modernizing its plants. Finally, when modernizing began, the machinery had to be imported mostly from Europe.

The first workable Fourdrinier machine, however, was invented and patented in France by M. Robert in 1799. Henry and Sealey Fourdrinier, wholesale stationers in London, purchased the British patent rights. They employed a well-known consulting engineer, Bryan Donkin, to improve it. The improved machine was patented in England by the Fourdriniers in 1807. This improved machine revolutionized paper manufacture and was the first great invention to the paper industry. Another notable invention was made by John Dickinson of London, who in 1809, patented

a cylinder covered with a wire screen which revolved in a pulp vat. Suction forced the pulp fibers to settle on the screen and become a sheet of paper. This wet paper was drawn on to another cylinder covered with felt and then put in a drying room.

#### Tennessee Encourages Paper Making

Tennessee, before the Civil War, was a paper-making state. In 1809, the General Assembly enacted two statutes to encourage the industry. The first which was approved on November 13, 1809, determined that: "Whereas, it is considered by the present legislature that an increase in the home manufacture will promote the independence of our rising state: Therefore, be it enacted by the General Assembly of the State of Tennessee that, from and after the passage of this Act, all persons immediately in the employment of the manufacture of paper in any of the paper mills erected in this State, or that may be hereafter erected, that they be and are hereby exempt from working on roads or highways or from attending musters in the companies, regiments or battalions to which they belong, provided that in all calls for militia they shall be subject in the same manner as they would have been had this Act never been passed."

This concession granted labor in the paper mills freedom from military drills and parades so that paper production could be maintained. The men were not exempt from service in the field. The concession was made because of the shortage and high prices asked for the various grades of paper.

The other Statute was dated November 23, 1811. It remitted a business tax on rags so that: "To encourage the manufacture of paper: Be it enacted, That all persons who are owners of paper, or shall hereafter be, shall be allowed to employ some person to peddle and merchandise rags without paying tax, provided nothing herein contained shall authorize those persons to take or receive any money or articles for said goods but rags."

Similar laws appear to have been passed in other states. All were interested in promoting new industries and paper manufacture promised to develop to large dimensions. There was everywhere a keen demand for paper and a scarcity of rags. All the newspapers of the period carried advertising, often quite amusing, seeking rags and stressing the importance of collecting them. It was at this time that the domestic institution of the old rag bag, for the collection of rags, came into prominence.

#### A Conspicuous Tennessee Paper Man

W. S. Whiteman, of Knoxville, was one of the most conspicuous of Tennessee's paper men. He learned the trade in Pennsylvania mills, worked in Tennessee mills and built his own mill on Middle Brook Creek, near Knoxville in 1835. It was a primitive mill, like the others at that date, furnished with machinery acquired in Philadelphia. Mr. Whiteman died in 1840 and his sons took over the business and built it up into an industry of importance.

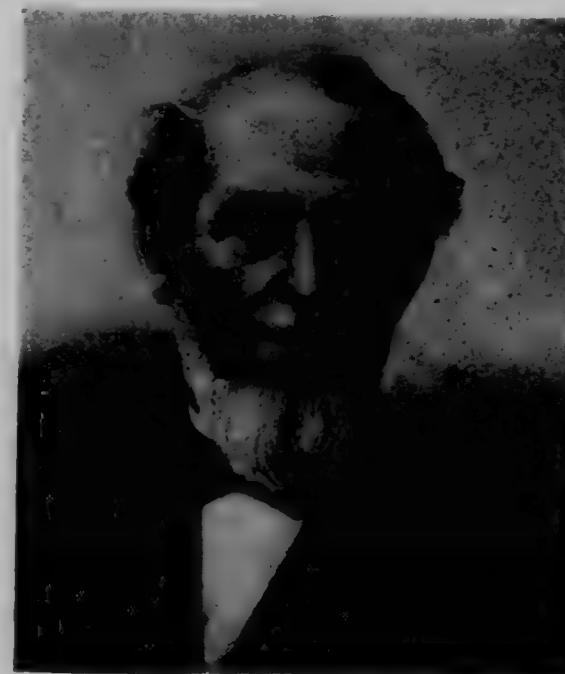


W. S. Whiteman, Jr., learned the trade in his father's mill. In 1840, he formed a corporation with John M. Hill, John McEwen and O. B. Hayes. A mill was built on Cumberland Creek and it was operated successfully by the company until 1848 when it was purchased by W. S. Whiteman, Jr. The Whiteman Brothers with W. O. Harris, publisher of the *Nashville Banner*, erected a mill on White's Creek. They also established a pulp mill for rags on Paradise Ridge. The Whiteman Brothers operated several other mills at this time, the chief of which was the Cumberland River. There were, in 1840, six other mills near Knoxville. They were operated by Messrs. Davidson, Sumner, Sullivan, McMinn, Knox and Granger. The combined capital of the Tennessee mills in that year hardly exceeded \$150,000, but their operations proved to be valuable to the state.

The pioneer paper mill in Louisville, Ky., was built by Jacob & Hicks in 1814, to supply paper to a local newspaper. There were nearly a dozen mills operating in Kentucky in 1815—two of which employed steam power.

The people of the town of the Forks of Elkhorn, Ky., tell an illuminating story of the founding of a paper mill on the river a mile and a half below the town. Amos Kendall, a political supporter of President Andrew Jackson, hearing that the government intended building an armory on the site, bought the land and constructed the mill in 1820. He was wrong in his speculation. The armory was built elsewhere. When Kendall heard of this he sold the mill to E. H. Steadman. This property was purchased by DuPont & Co. in 1875.

Kendall went to Andrew Jackson for solace and was rewarded by a cabinet position. He became Postmaster General of the United States. This was one of the early encounters between the paper making industry and politics and showed the crude condition of political morality prevailing at that period.



J. C. PARSONS



WELLS SOUTHWORTH

American paper makers had received accounts of Robert's, Fourdrinier Brothers' and Dickinson's inventions when the patents were issued. Many built experimental machines. It was twenty years after Robert's and seven years after Dickinson's patents were granted before the first cylinder machine was commercially used in the United States.

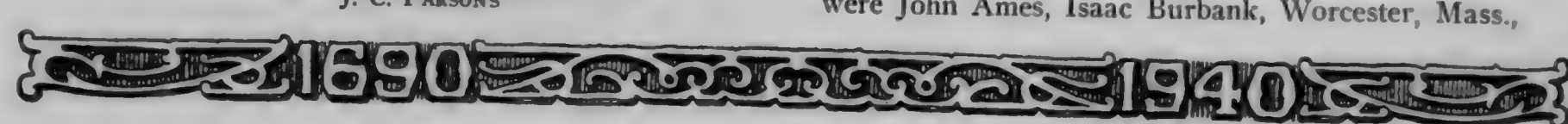
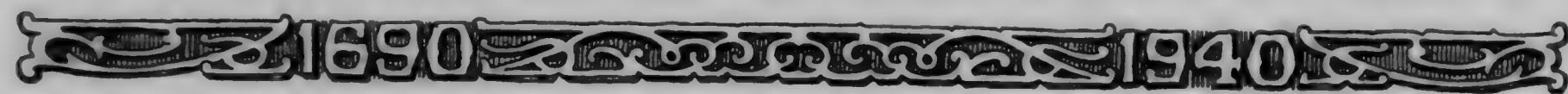
Joshua Gilpin, who had built and patented one in 1816, placed it in operation in his mill a year later. This was so successful that the business grew rapidly. Papermakers from all the states visited the Gilpin factory. Earlier in 1807 Charles Kinsey, Essex, N. J., patented a cylinder machine and John Ames of Massachusetts secured a patent also. These patents led to litigation extending over many years.

#### The First Efficient Mechanical Paper Mill

The Gilpin Mill was the home of the first efficient mechanical paper plant operated in America. Its machines showed speed, economy in manufacturing and production while yielding papers of higher qualities.

The Gilpins tried to keep the details of construction of their cylinder secret. News travels fast and visitors to the mill and to exhibitions of its products told stories of their excellence that attracted the attention of the trade. It was the first extensive publicity given to any American paper mill machinery. The more publicity the mill acquired, the more jealously the Gilpins tried to keep the details of their machine secret. It was in vain. Competitors strove to improve the quality of their paper and found a machine like Gilpin's was essential. More experiments were conducted and many new machines were built. Between 1818 and 1830 numerous mills were equipped with cylinder machines. The result was a loss in the Gilpins' business, their prestige declined and, eventually, they failed.

Among other successful cylinder machine makers were John Ames, Isaac Burbank, Worcester, Mass.,







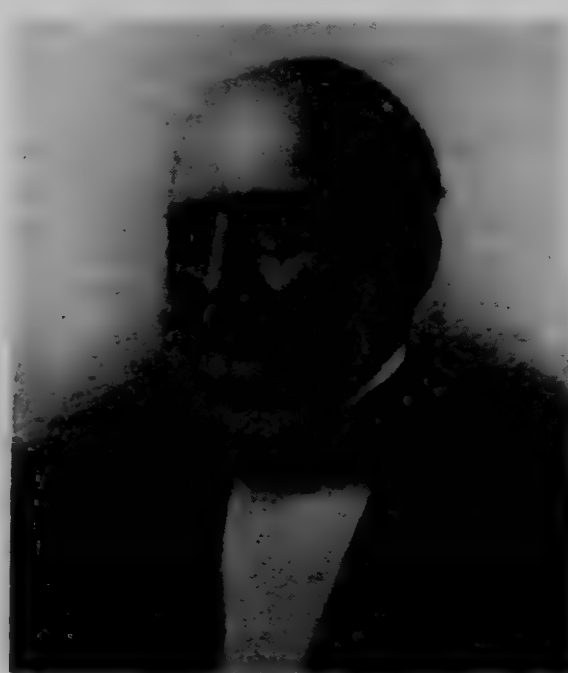
in 1824; Garinder Burbank, in 1826; and Isaac Sanderson, Milton, Mass., in 1829. Machines of these makers were supplied to many mills and in a few years every important mill was equipped with one or more cylinder machines.

Bryan Donkin, between 1807 and 1830, made 200 Fourdrinier machines in England. In 1827 Henry Barclay, fourteen years after the Fourdrinier Brothers secured Robert's patent, imported the first Fourdrinier into America. It was sold to Beach, Hommerken & Kearney and erected in their mill in Saugerties, N. Y. It was a Donkin machine 60 inches wide. This machine was in constant use until 1872 when it was destroyed in the mill fire. The second Fourdrinier machine built in England by Joseph Newbold, of Bury, was erected in the same mill in 1829. These pioneer machines attracted wide attention and, in a few years, all the larger mills in the United States were fitted with Fourdriniers.

#### The First American Fourdrinier

The Smith & Winchester Manufacturing Company, South Windham, Conn., built the first American Fourdrinier in 1829. It was purchased by the Hubbard Mill, Norwich, Conn. It gave good service and was followed by the building of many similar machines.

James M. Wilcox, of the Ivy Mills, in Pennsylvania, described the machinery in use in American paper mills in 1850. He said all the early improved machines were imported from England. The English Fourdriniers were not always suited to American conditions and were too expensive. The Fourdriniers made locally, in his opinion, were better, especially those made by Phelps & Spafford, of Windham, Conn., and by Howe & Goddard, of Worcester, Mass., the principal manufacturers. His opinion of cylinder machines was that: "The cylinder machines, more simple and less costly than the Fourdrinier, are in more general use; but the pa-



ALVAH CROCKER



per made on them is not equal in quality. They do very well for news and the various purposes for which a coarse article will serve."

Felts were imported from England up to 1864. In that year Johnson, Fuller & Co., Camden, Me., undertook their manufacture. This firm was purchased in 1872 by the Knox Woolen Company and the felts are now made by one of its successors.

Fourdrinier wire was imported from England in the early days. In 1847, William Staniar of Manchester, England, an expert wire drawer, came to America to establish a works to manufacture Fourdrinier wire. He became associated as a partner with Stephens & Thomas of Belleville, N. J. Cornelius Van Houten made the first American loom for Stephens & Thomas and Staniar turned out wire. Difficulties from many causes were met with in distributing the wire. They were overcome. Later Robert Buchanan and John McMurray came from Glasgow, Scotland, and established wire works in Jersey City, N. J. By 1897, there were twenty factories in the United States running over 200 looms on Fourdrinier wires, cylinder covers, dandy covers and washer wires.

#### The First American Dandy Roll

Staniar and Van Houten, of the Stephens & Thomas works, made the first American dandy roll in Belleville in 1847. According to William Staniar, "Four impressions of a sheet 22 by 24 inches were taken off and 42 impressions were put in the same place, there being 1,092 letters, some of the Romans were not more than one-eighth of an inch in size."

Many patents were taken out between 1800 and 1830 for paper mill machinery. They ranged over a narrow field owing to the difficulties experienced by inventors in securing the adoption of their machines or in getting adequate capital. They were concentrated on improvements in cylinder machines; methods for pulping vegetable fibers; sizing, weighting and cutting paper sheets; drying and pressing appliances and cutting tags or making molds. The general use of rags had a marked restrictive effect on plant development also.

The subsequent replacement of water power in mills for steam and electricity proved beneficial to inventors and in a still later period, the introduction of chemical processes led to the greatest revolution the industry had experienced.

In all ages the practice of an art lags behind scientific and theoretical knowledge of the art. This is because man is a creature of habits. It requires long practice to acquire a habit and when one is attained, it is difficult to modify, or abandon it. Business men study habits for acquiring wealth and have little time for scientific and theoretical speculations regarding their business. They are consequently nearly always conservative. Many demonstrations of improved machinery and processes must be made to convince them. In the pioneer days of the industry empirical rules dominated the mills, and the pleadings of inventors were unheard.



## CHAPTER IV

# Paper Mills Spread To Various Sections

THE first paper mill in western Pennsylvania was built in Brownsville, on the Monongahela River.

It was called the Old Redstone Mill by its owners, Samuel Jackson and Jonathan Sharpless. The mill was opened in 1796 and supplied the newsprint for the *Pittsburgh Gazette* and other newspapers. The mill also made book and writing papers.

The pioneer mill in Wisconsin was built in 1846 at the junction of the Milwaukee and Menomonee rivers, where Milwaukee is now situated. It was operated by its founders, Livingston & Garland until 1851 when the Milwaukee and St. Paul Railroad Company purchased the site for a warehouse. The machinery was taken to Humboldt, three miles north of Milwaukee, and used in a new mill owned by Noonan & McNab. This mill operated until 1867 when it was destroyed by a flood. The owners then purchased the Prieger Mill on the Menomonee which they operated until 1874 when it was destroyed by fire.

#### Other Mills Around Milwaukee

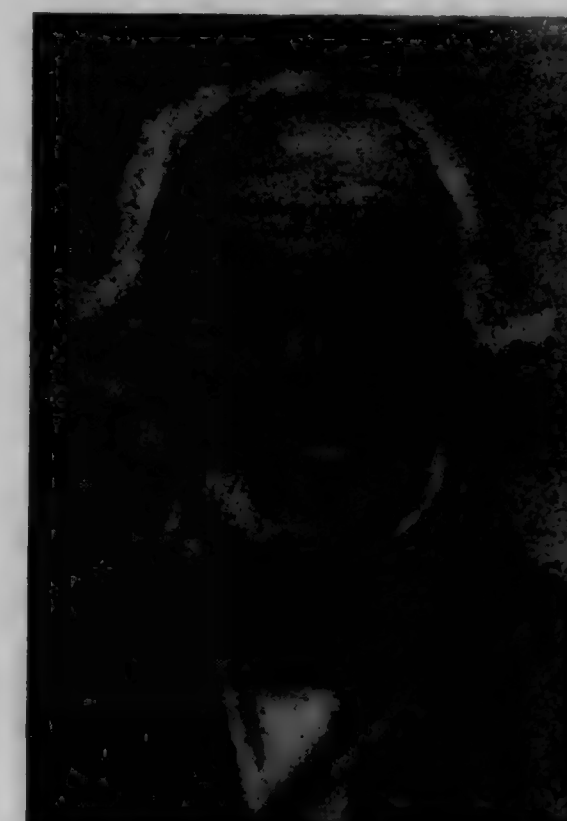
Other mills around Milwaukee were built between 1860 and 1870 by Alexander Mills, G. N. Richmond, Butler & Hunt, Bradner Smith & Co., The Ames Wood Pulp Company, F. N. Davis & Company, Wright, Merrill & Newcombe, L. J. Mathers and Nightingale, Bostworth & Co. These mills were operated actively for a few years supplying newsprint to local newspapers. As railroad transportation improved, competition caused them to migrate to other districts or to close.

The Pioneer Mill was the first to operate in Jefferson County, New York. It was built in Watertown in 1808 by Gordon Caswell. It was furnished with a Hollander machine carrying 150 pounds of rags, three potash kettles set in a brick arch for boiling the rags and preparing the sizing. It had a single vat for making the paper and a simple press to squeeze the water from the paper sheets. When squeezed, the paper was taken from the pack, sheet by sheet, and hung on poles to dry. Writing paper was taken from the drying poles, dipped in sizing and returned to the poles for a second drying. No steam was used, and no chlorine for bleaching. The sheets were pressed between boards in place of calendering. This mill cost about \$5,000. It was purely a hand mill and employed four men and three or four women. It produced 150 pounds of paper daily. It was not worked at high speed; because rags were scarce, the demand for paper was limited and the large amount of idle hours were spent by the men in saloons. This mill was typical of many all over the eastern states at that period.

The Pioneer Mill was operated until 1824 when

it was purchased by Knowlton & Rice. That firm took the machinery out in 1833 and added it to a mill they operated nearby. Knowlton & Rice became the leading paper manufacturers in the district. They bought numerous small mills and operated them until 1854 when the firm was dissolved. Mr. Rice retained interests in several of the mills. Mr. Knowlton's sons purchased, or built, other mills, operating under the firm name of Knowlton Brothers. Their Black River Mill had two Hollander machines and the first machinery for making a continuous sheet of paper. This was made over a 36-inch cylinder. The wet web of paper was at first wound on a reel, cut open with a knife and dried on poles. Later, copper driers, calenders and a cutter were added to the plant. This mill was in operation until 1848 when it was destroyed by fire. It was replaced by a larger brick mill furnished with three rag engines and improved machinery. The capacity of the new mill was 700 pounds of paper daily. This mill was replaced by a new and larger one by the same firm in 1869.

These early mills made a variety of papers to meet local demands. The same rag mill turned out ruled foolscap, letter, newsprint, wrapping, book or tissue papers. Railroad development increased the opportunities for exchange of goods with distant parts of the country and this gradually led mill men to specialize on one line of goods. In 1854, Knowlton



GEORGE BIRD







Brothers began specializing on fine writing papers. Other mills made newsprint or wrapping papers. The economic effects of this concentration were interesting to notice. They were the change from a general to a special business and often to a change of locality. Today, similar economic forces are operating and promoting a slow migration of industries to different parts of the country, as will be noticed later. The migration of mills results in the migration of labor and distribution centers.

The Remington and Taggart families were prominent paper men in Jefferson County, New York. Illustrious Remington & Sons operated a mill at Fayetteville, N. Y., which they enlarged in 1854. It had four Hollanders and one 84-inch Fourdrinier machine. It specialized on newsprint of which three tons a day were shipped.

A. D. Remington acquired a mill in Watertown, N. Y., in 1863 and in 1865 he organized the Remington Paper Company which became one of the largest American paper manufacturers. A few years later a larger plant was needed and a new mill was constructed on Sewall's Island. In this mill some of the first wood pulp machinery was introduced. This change proved most profitable. Business increased and the company greatly extended its operations.

George W. Knowlton, of Knowlton Brothers Paper Company, in speaking about the changes in the manufacture of paper in his time, told an interesting story illustrating the conservatism of business men generally. When his firm was operating, speed of machines was not of much moment. When he retired and competition began to spread, speed became of great importance. Two of the Knowlton machines had an extreme speed of 36 feet a minute. A. D. Remington was one of the first mill men to appreciate and acquire a fast running machine. He purchased one with a speed of 100 feet per minute. These speeds of the early machines are in contrast with speeds exceeding 1200 feet today.

#### Show Wrapping Paper

Straw wrapping paper was an early product of the State of New York. The first mill was built above Chatham Four Corners, on the Steinkill River, Columbia County. In 1826, Eleazer Cady, built a paper mill there, having a small Hollander and making paper by hand for the local trade. It was good paper. Often the small country hand mills turned out irregular products depending upon the skill of the workmen. These men were often wanderers, not staying long in any employment. They considered the vat-man to be the most accomplished in the mill. The man who could hold a molding box level so that the fiber became steady and then cast a sheet of paper of uniform thickness and evenness was looked upon as a master of the art.

Many country banks and business firms owned their own molds and water marks which they sent to the mills with their orders for paper. The molds

were then returned to the owners and placed under lock and key until a new order was given.

The Cady Mill, Chatham Four Corners, was purchased in 1830 by Hamilton & Wright, mechanics and paper makers. They made a Hollander machine and made paper from straw pulp. This mill attracted attention because of its Hollander being the first to operate in Columbia County and because it used straw pulp. In 1832, Hamilton became sole owner of the mill which he later sold to Cornelius Shufelt. Rathbone & Simmons were later owners. Peter C. Tompkins, Horace W. Peaselee and Plato B. Moore were pioneers in improving the manufacture and bleaching of straw pulp and in building many wrapping paper mills.

#### Indiana's First Paper Mill

Indiana's first paper mill was built on Big Creek, twelve miles north of Madison, by Isaac Mooney, in 1826. Many small mills were built in other parts of the state. Most of them had brief careers. The William Sheets Mill, on Indian Kentuck Creek, built in 1827, continued in operation until 1866. The Wilson, Hanna & Barber Mill, in Lafayette, operated until 1874. The George Robertson Mill, Delphi, built in 1846, continued in use until about 1867.

Lamden & Son, owners of a mill in Ohio, in 1830, were the pioneers of the industry in West Virginia. In 1832 the Fulton Mill, Wheeling, was built by Alexander Armstrong, Frederick Trendley and others. This plant was operated by different firms until 1857.

There were numerous attempts to establish the manufacture of paper in Kentucky and other Southern states in the early days. The small mills generally had a precarious existence. The first was erected in Louisville in 1814.

#### The First Paper Mill in Maine

Samuel Waldo, a Boston merchant, built the first paper mill in Maine in 1731, situated on the Presumpscot River, Falmouth. It was a small hand mill which was destroyed by fire in a short time. In the same district, in the same year, Col. Thomas Westbrook built a mill in Stroudwater. In later years many other small mills were operated in this state. The records show that they were not long-lived, because they were destroyed by fire, one of the greatest hazards of early mills.

A mill was built for Brigham Young in 1860 in Utah. It was made from a converted beet mill. A 36-inch Gavitt cylinder machine was purchased in Philadelphia for the mill. In the spring of 1861, the plant was completed and the first paper was made on July 24, 1861. There were two rag engines, of 150 pounds capacity, in the mill. Newsprint, book, writing and wrapping papers were made. Tinted paper for envelopes and boards were made whenever there was a demand. Quicklime was used for bleaching and rosin was the sizing material.

This mill continued with indifferent success until



the year 1863, when the machinery was moved to the new Granite Mill, which had been built at the mouth of the Big Cottonwood Canyon, 13 miles from Salt Lake City. The mill was moved owing to the failure of the water power at the old site.

In addition to the old machinery a new 66-inch Fourdrinier machine, six rag engines, each with a capacity for 1,000 pounds of rags, a rotary boiler, together with all the recent improvements, were placed in the mill at the new site. This new mill was well constructed. It had a capacity of five tons of paper every twenty-four hours. By that time raw materials had become plentiful.

A drawback we experienced at the old Sugar House Mill was a lack of raw material. There was barely sufficient to run the machine two days a week. Cotton rags, gunny sacks and waste paper. A small percentage of woolens was used in the wrapping paper while the bulk of the woolen rags was used in making flocks for beds.

The Granite Mill continued operations until April 1, 1893, when it was unfortunately destroyed by fire. No paper is manufactured in Utah today.

Before the Civil War, small mills catered to the paper needs of their vicinities. The war made many economic changes in the country. Old trading customs and associations were disrupted. Many of them were never restored. The seventh census shows that there were 443 paper mills in operation in 1850. Their combined capital was \$7,260,864 and their raw materials were valued at \$5,555,929 annually. Their products were valued at \$10,187,177 yearly and they employed 3,835 men and 2,950 women. In 1859 there were still 443 mills operating, but some of these had been enlarged. Annual production was correspondingly increased. From the end of the Civil War until today the paper industry has steadily increased. Mass production by improved machinery has been the aim of mill men.

A glance at the state of the art at the end of the war period shows the final stages of the disappearance of the old methods of manufacture which met the needs of their times but which could not cope with the rapid economic developments that took place after the reconciliation. H. H. Porter of the Plat-



Courtesy Beckett Paper Co.

ORIGINAL BECKETT MILL, 1848



Courtesy Beckett Paper Co.

BECKETT MILL IN 1855

ner & Porter Company, Lee, Mass., specializing in fine writing papers, describing the procedure in his plant just after the war, wrote that after many experiments with paper stock a lot was made up of old papers costing ten cents per pound, four bales of hemp at six and a half cents per pound and six bales of grass rope at six and three-quarter cents per pound. The hemp and rope were chopped up by hatchets and pulped. The results were unfavorable. None of the paper could be marketed. It was found that stock composed of ledgers and account books was the best. It was thrown into a boiling vat and stamped down by the men jumping on it. Then a thick coating of soda ash, costing six and a half cents per pound was spread over it. Alternate layers of paper stock and crude soda ash were charged until the kettle was filled. Steam was turned on and the mass was boiled for thirty-six hours. A valve was opened then and the soda liquor was cast into the stream. The pulp was thrown out of the kettle by pitchforks. Large lumps of soda could be seen adhering to the wet mass. This was typical of the art just prior to the introduction of the chemical treatment of paper stocks. The scientific processes called for the employment of chemists who were instrumental in starting revolutionary changes throughout the paper industry—changes which are continuing to be made today.

There were many well trained men in the paper industries in the early days and in looking over the records of their work, its crudeness appears everywhere. They lived in good old days. Competition was keen, distribution difficult and costly, raw materials were scarce and financing the work was not simple. It was not these difficulties that kept the industry in its narrow groove and arrested its technological development. It was an apathetic conservatism based upon inherited prejudices which suggested that the methods employed were satisfactory and enabled good profits to be secured by hard work. There was nothing peculiar in this. In all industries, in all ages, the men who control business are routine workers. The analysts, experimenters and inventors are unusually active, imaginative and discontented men. The advance patrols of industry and of civilization are members of a small army of revolutionists.







## CHAPTER V

# Ground Wood, First of Pulping Processes

**V**ARIOUS methods for pulping were developed after the discovery of the importance of wood for pulp. Five methods are of importance today—mechanical grinding of the wood; the sulphite process; the soda process; the sulphate process and numerous semi-chemical processes.

Grinding stones, rolls and other machines are used for grinding wood to pulp. Mechanical pulp contains all the constituents of the wood from which it is made and it is used in newsprint, wall and other papers that are not expected to last a long time.

### Early History Not Clear

The history of ground pulp is not clear in its inception. Dr. Schaeffer published a paper in Bavaria, in 1756, in which he advocated the making of pulp from sawdust. When his ideas were placed to the test they failed on account of the poor machinery employed. A hundred years later Friedrich G. Keller discovered, like Reamur, that the nests of wasps are composed of small wood fibers glued together so as to resemble a rough kind of wrapping paper. He enlisted the aid of a mechanic, Henry Voelter, who devised a machine which ground wood to a pulp with fibers similar to the wasp's. In the sixties, French, English and later American patents were secured in Voelter's name and he and not Keller has the honor of being looked upon as the founder of the ground wood industry.

In the exhibition in London in 1862 and Paris in 1867, working plants operating the Keller process were shown. In that year, several mills employing the process were in use.

The Pagenstechers, Albrecht, Alberto and Rudolph of Stockbridge, Mass., imported two Keller-Voelter machines from Germany and employed them in their factory in Curtisville, Mass., in 1866. The Smith Paper Company purchased the Pagenstecher pulp and, finding it satisfactory, decided to use ground wood pulp exclusively on newsprint. The Pagenstechers in 1869 acquired the Keller-Voelter patent rights for the United States. The patent expired in 1884.

Albrecht Pagenstecher related that while the Smith Paper Company purchased his mill's output and were satisfied with the pulp, other mill men would not try it. Their sentiments were expressed by one as follows: "Mr. Pagenstecher we shall not take an interest in shoddy." Through persistent salesmanship, Albrecht Pagenstecher sold machinery to mills in Lawrence, Fitchburg and Lee, Mass.; Norway, Me.; and Lanesville, Conn.; which all made ground wood pulp in 1869-70. The Pagenstechers purchased water-power rights and land in Luzerne, N. Y. A mill was built and the Hudson River Pulp

and Paper Company was formed in 1869 to operate it.

### Other Ground Wood Mills Start

The year 1869 was memorable for the other ground wood mills that were started and later became large makers of paper. William A. Russell built pulp mills in Franklin, N. H., and Bellows Falls, Vt. Warner Miller built a large mill at Palmer's Falls and Alvah Crocker built a mill at Turner's Falls. This mill later developed into the Montague Paper Company's plant.

The pioneer mill at Curtisville produced half a ton a day. The pulp was pressed into cakes by a hand press. The larger Luzerne Mill pulp could not be treated by the slow hand press and Warner Miller suggested running it over a wet machine. This was satisfactorily done. Miller was the first to do this commercially.

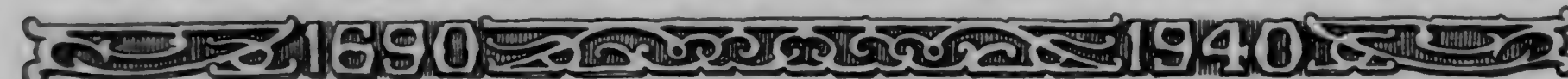
Ground wood pulp sold at eight cents per pound in 1870 and then dropped to four and five cents as new mills started production. Some years afterwards it slowly declined to one cent a pound. These changes brought corresponding declines in the prices of paper. Newsprint was reduced from fourteen cents per pound, in 1870, to two cents in 1897.

When the pioneer mills, nearly all of which were financed by men who had no knowledge of the paper industry, proved successful, practical paper men began to give them attention. They attempted to avoid the Voelter patent and caused the real patent holders much litigation. Some men believed that the patent claimed the use of grinding stones. They attempted to get over this by using emery wheels, steel cutting rolls and similar devices. The patent, however, claimed the process of grinding fiber off the side of wood, because experience had shown that this is the only way in which the fibers are secured in the longest lengths.

### Bagley & Sewall Build First Grinders

The first wood pulp grinding machines made in America were built by Bagley & Sewall for the Warner Miller Company Mill, at Lyons Falls, N. Y. They cost two hundred and fifty dollars each.

When Voelter's patents expired in 1884, many manufacturers of machinery built them. At this time there were many ground wood mills in operation. Competition among engineering firms resulted in many details of the mills being improved. A hydraulic feed replaced the old screw feed in 1885. Photomicroscopic tests of the pulp, when newly ground, were made so as to control the number of fibers in a given sample of pulp. Likewise methods for testing sedimentation were devised. Heating

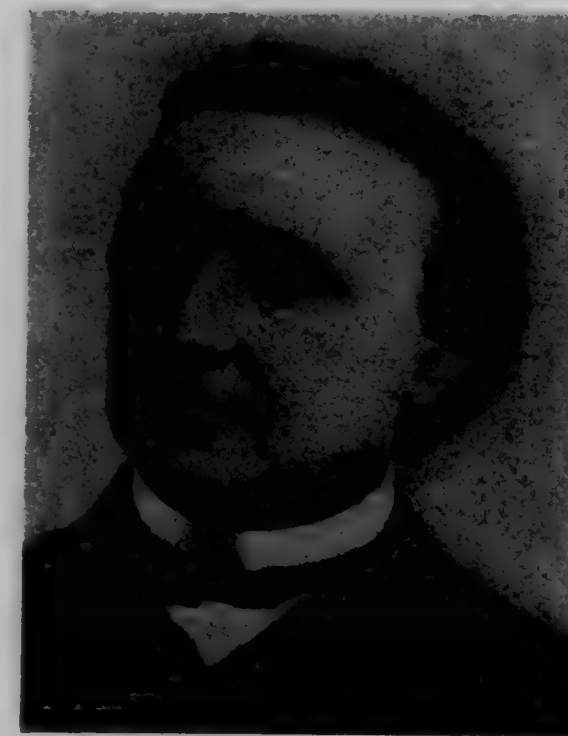


attachments were used to increase the temperature and improve the quality of the pulp during grinding. Voith in Germany, made a magazine grinder in 1912 and the Cliff Paper Company, Niagara Falls, N. Y., in 1913 installed two of Voith's machines. Stone sharpening machines were slowly evolved for conditioning the grinders. Roberts Brothers and George C. Sherman were active in this field.

### The Great Northern Grinder

About 1934 an improved type of grinder, called the Great Northern was installed in the Finch, Pruyn Mill, Glens Falls, N. Y. George K. Walker, the mill superintendent, reported that these grinders are paired into four lines, each line operating with 2400 h.p. The stones are running at 220 r.p.m. controlled by Meyer governors, under a pressure of 52 pounds and manufacturing approximately twenty tons of pulp per day at 55 to 60 h.p. per ton. The grinders are equipped with Taylor temperature controls which eliminate manual supervision. The operating crew for the pulp mill with this set-up of grinders is four men per tour, against the old method of grinding which required eighteen. The time required to change stones is comparable to the old three-pocket type of grinders. The position of the hydraulic lathes at the top of each grinder, lending easy accessibility to burring the stones, is another good feature of these units.

The grinders are equipped with artificial stones, on one grinder we have a Carborundum 56 grit, and the remaining seven stones are four Norton 60 grit, three 50 grit. The present application of burrs to the face of the stones has reduced our stone cost to 6½ cents per ton, and by actual measurements we find our stone wear is approximately 1/16 inch per month. The burring cycle of all the stones for the last three months operations has averaged 117 hours between sharpenings, against the old method



ALBRECHT PAGENSTECHER



CURTISVILLE MILL, WHERE FIRST GROUND WOOD WAS MADE.

of burring each stone once every eight hours. After burring, the pits and stone surface are always carefully washed to eliminate the grit present.

It is estimated that, in the United States, mills producing about forty per cent of the newsprint are using Great Northern Grinders.

### The Sunnydale Mill

The excellence of the machinery built for mills by our engineers is shown by the story of the Sunnydale Mill, Newark, New Castle County, Del., was celebrated for its old paper machine, a relic of olden times. It was a small mill built and operated, in 1811, by John Farra, and later by his son Daniel. Several times it was destroyed by fire. In 1860, it was purchased by Francis Tempest who operated it until 1901 and he was succeeded by Edwin Garrett. This historical mill was operated until 1930 and was dismantled in 1933. Its last owner was the Beaver Valley Paper Company and its output was 2,000 lbs. of paper per 24 hours. From its inception to its end its power was both hydraulic and steam. Its motive power was not changed during its one hundred and eleven years of activity.

In the longest period of its career, this mill had in operation a single one-cylinder paper machine, 36 inches wide. At different times it made different paper. Its chief output, however, was tissue. The width of this machine limited the output throughout the years to 1000 lbs. per day until 1901 when a larger machine was added which doubled the capacity.

### American Leads Speed Development

It was shown in 1873 that the output of a paper machine depends upon the area of its cylinder and its speed. Carl Hofmann demonstrated this in his well known book in 1873. Thereafter, American engineers led the way in developing its speed. The Smith Paper Company, Lee, Mass., had machines built in 1866, with a speed of 100 feet per minute. They were successful. The Glatfelter Mill, Spring Forge, Pa., ordered a machine to be built by the Pusey & Jones Company in 1880. It was a 100-inch machine making 94 inches of paper. This was two inches wider than the Smith Mill's. The speed was 200 feet per minute. That was double the average speed in 1867 and three times greater than the speed of the Sunnydale Mill.





Warren Curtis designed a machine with a speed of 250 feet per minute. The Fourdrinier part of this machine was 112 inches wide, the wire was fifty feet long and it had fifteen driers, each of 48 inches in diameter arranged in two tiers, nine below and six above. The Hazard swinging arm pressroll housing was invented for this machine. It was purchased by the Hudson River Pulp and Paper Company and was by far the finest and most efficient machine built in that period.

The Pusey & Jones Company built machines for the Palmer's Falls and Glens Falls Paper Mills, between 1885 and 1895, which were improvements on the Hudson River Company's machine. The speed was 250 feet per minute. The mill engineer, Charles Bragg, believed the machine could be run at a speed of 300 feet per minute. He was able to secure that speed by furnishing it with improved felts.

The next forward step was taken in 1897 when five machines were built by the Pusey & Jones Company for the Glens Falls, Hudson River, the Palmer's Falls, New York and the Glen Manufacturing Company, Berlin, N. H. These machines had a speed of 500 feet per minute.

#### Endeavor to Increase Output

In 1868 and earlier, the speeds of several sections of paper machines were varied by adding to or tak-

ing away canvas strips to the faces of the driving pulleys. The machine tenders were constantly engaged with canvas and glue pot in adjusting these strips. To avoid that annoying labor, an expandable pulley was invented and patented in 1869 by Thomas Lindsay, engineer of the Augustine Mill, Wilmington, Del. It was a success and in later years it was improved by the makers, Pusey & Jones.

Houffray, Cadet & Sons, of Paris, patented a cone pulley in 1877 which, operating with bevel gears, revolutionized machine drives. They were widely adopted in European mills. American mill owners refused to recognize their merits. They objected to cone drives because they required the use of a pair of bevel wheels for each section of a machine. What American paper men wanted was increased output of paper per machine. Expanding pulley speeds were increased to the extent that it became difficult to vary their sizes. The cone drive obviated these difficulties. They could be easily adjusted at any speed. They also could be operated by narrower belting. George E. Marshall, of Turner's Falls, Mass. secured a United States patent for the cone pulley. It became known as a Marshall driving train.

In recent years, sectional electric drives have been successfully operated in large mills. A new drive incorporates a variable pitch V-belt in the drive to take the place of cone pulleys. It is called the Sandy Hill selective drive.

## CHAPTER VI

# Introduction of Chemical Pulping Processes

THE introduction of the chemical processes in manufacturing wood pulp resulted in one of the greatest and most stimulating revolutions in the development of the paper industries. The earliest pulping method by chemical means was patented in England in 1852 by Hugh Burgess, of Reading. Several years before Burgess and Charles Watt, in a mill in Boxmoor, Hertfordshire, had made excellent white book and writing paper from wood pulp. The process was thoroughly tested commercially before the patents were issued. Burgess arrived in the United States in 1854 and secured American patents. He made the first wood pulp into paper in the Warren Mill, in Maylandville, Pa. in 1855. Later in that year Burgess built a larger mill at Royer's Ford, on the Schuylkill River, and managed it until 1895.

#### Burgess' Work Not at First Appreciated

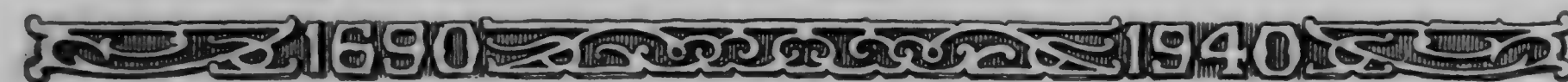
Burgess' great work was not at first seen to be valuable by American paper manufacturers. A few, like the Megargee Brothers, Jessup & Moore and Martin Nixon, realized that it could be used for print paper. But the majority remained for some years strongly prejudiced against the process.

The mills using the Burgess process discovered

that it enabled them to use, besides rags, many cheap materials. Tests were made of spruce, fir, hemlock, the stem or bast fibers of many plants, flax, straw, hemp, corn and cane stalks, bamboo, sisal, pineapple leaf, coconut and many other organic fiber-bearing substances, with good results.

In later years, when new mills were being planned, the class of materials for pulping were studied with these major factors in view: (1) Dependability and extent of supply, (2) The cost of Distribution, (3) The cost of storage, (4) The seasonableness of supply, (5) The deterioration of supplies in storage, (6) The yield of suitable fibers per ton, and (7) The cost of preparation of the fibers for pulping.

The use of wood pulp as a basis in the paper industry caused changes in the geographical distribution of the mills. Pennsylvania, New York and, later, New England mills developed the pioneer mills; because they were best suited for distribution purposes and also to the supplies of rags. When wood-pulp supplanted rags, mills were built in Wisconsin, Michigan, Minnesota and other northern and mid-western localities. Later the forests of the western and Pacific north-western states were drawn upon for pulp supplies. In 1920, the Southern states were encom-



passed in the pulpwood supply field. While the trend of mill centers has been definitely towards the locations of the great forest areas, the industry in the old pioneer states continues its strong development. The new fields have failed to displace the old.

Hugh Burgess was the pioneer developer of commercial pulping of spruce. It should, however, be remembered that the effects of soaping, acid and alkaline solutions on wood were familiar to the alchemist many centuries ago. Numerous European chemists in the eighteenth and nineteenth centuries demonstrated the effects of acids and alkalis on wood. Science generally blazes trails to new chemical processes many years before an inventor applies a process to a commercial use.

#### First Important Use of Burgess Process

The American Wood Paper Company, in Manayunk, Pa. was the first important company to use the soda pulp process of Burgess. It was established in Philadelphia in 1865, by Embree & Egolf. When Bloomfield H. Moore died, in 1876, the Jessup & Moore firm was dissolved. The surviving partners, in 1877, incorporated the Jessup & Moore Paper Company. It built the Delaware mill in 1879. The mill was not operated until 1881. The company was dissolved in 1884 as a result of the failure of the directors to run it profitably.

The S. D. Warren Company, Cumberland Mills, Me., actively experimented with soda pulp in 1875-6 and subsequently employed it. In Holyoke, Mass., D. H. & J. C. Newton had a soda pulp mill in 1878. Martin L. Griffin, a consulting chemist, related that in 1883 he was called to the office of the Newton Mill by Daniel Newton, the manager. "Mr. Griffin" he said "we are having many difficulties with our customers over moisture in our pulp. I want you to come to the mill every morning and evening and sample the pulp. Take fifteen or twenty pounds each



S. D. WARREN

sampling—no homeopathic samples for me." That was one of the first references in the records to the annoying problem of pulp moisture. The practically important characteristics of wood pulps are quantity and quality of fibers and the degree of resistance of the cellulose to alkaline hydrolysis and oxidation. This necessitates careful sampling of the pulp, the chemical estimation of the contained moisture and the correct proportioning of the treatment liquors.

#### Poplar Wood First Used for Soda Process

The first pulpwood used in the United States for the soda pulp process was made from poplar and aspen logs. Barking was done in the wood yard by men with draw shavers. Later on, the wood was cut in the forests and stripped of its bark during the sap growth period.

The liquor mixing process has undergone many changes. In 1885, black ash and lime were dissolved in water, the solution was boiled and passed through a filter of coal-ashes. The alkali, in a later time, was leached out in open tanks furnished with false bottoms. This method was followed by leaching in a series of closed diffusers. It was followed by a system of continuous filtration.

The value in controlling moisture in pulp is demonstrated in straw mills. Straw cellulose has a strong capacity for hydration, or water absorption, and partial gelatinization when submitted to the action of beating. Wetness in pulp results in the qualities of hardness and "rattling" in finished paper as is illustrated by straw pulp papers.

The Jessup & Moore mill was furnished with direct fired stationary digesters for cooking purposes. It was a simple boiler with a coal fire at its base. The Newton digesters followed. They were vertical stationary boilers heated indirectly by steam coils surrounding the interior wall of the digester.

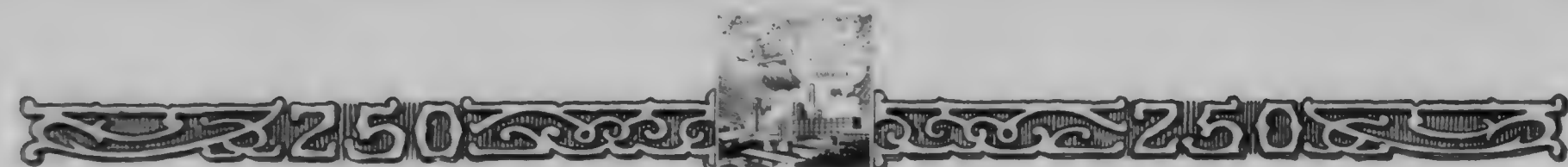
The Mechanicville digester was subsequently developed. It has a large steam-coil heated dome. The



HUGH BURGESS







cooking liquor was pumped through the dome in its passage through the boiler.

Upward and downward-circulation of the cooking liquor were tried and had their advocates. Live steam discharged into the digester through an injector was an early practice in the Ticonderoga and Willsboro Mills. The time of cooking has been improved. It is now less than half what it was in the early soda plants. In other respects the preparation of the leaching solutions had not been modified in any important respects.

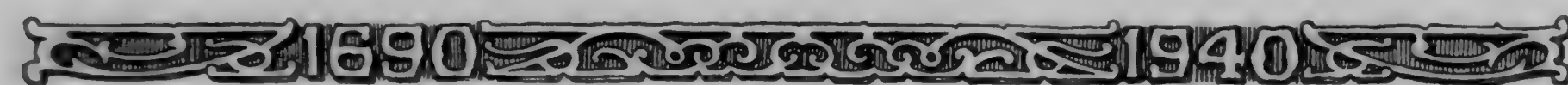
#### Recovery System Greatly Improved

The recovery system has shown the greatest improvements and it has been suggested that it is the efficiency of the recovery methods that is continuing to support the soda pulp processes. The pioneers evaporated the black liquor in open pans. In the Ticonderoga Mill, Ticonderoga, N. Y., the pans were arranged in a vertical stack. They were fired direct from a furnace below. The hot furnace gas was carried around and over the pans. The liquor was pumped into the pans counterwise to the direction of the evaporating gas streams.

The Mechanicville, N. Y. Mill treated its liquor in two long pans set in a brick furnace. The pans were fifty feet long and were set within the brickwork tandem wise one above the other. The plant was operated like an iron-puddling furnace. The black ash was pulled in flaming masses from the side doors of the furnace while the organic matter was incinerated. Two important improvements were made in this process in 1888. A multiple effect vacuum pan, like that used in sugar refineries, was suggested by H. T. Yaryan, Toledo, Ohio, whose improvements in film evaporators benefitted several of the large chemical industries. Colonel A. G. Paine formed a syndicate and purchased the patent rights for the paper indus-



B. B. TAGGART



try to reclaim soda ash. The syndicates investment proved very profitable.

The introduction of the rotary kiln, similar to what had been employed in the metallurgical industries, in cement manufacture, and in many roasting operations, made the second great contribution to the improvement in the recovery of the alkali from the used liquor. The rotary furnace comprised a steel cylinder ten feet in diameter, sixteen to twenty feet in length, which had a brick hearth or firing unit at one end. The interior of the cylinder was lined with fire-brick. Waste heat from the furnace was employed to feed a boiler to raise steam for evaporating the water in the spent solution. The operation of the furnace was almost automatic. Before these improvements were made, recovery costs amounted to fifty cents per hundred pounds of recovered alkali. This was reduced to five cents per hundred pounds.

In some works the soda is leached from the soda ash so as to leave only a black, finely divided carbon sludge. This is usable for filtering or decolorizing purposes.

Causticizing results in converting carbonate of soda into sodium hydroxide or caustic soda. Chemical engineers have developed machinery for this purpose to a high degree of efficiency. Numerous processes are used. The Dorr Continuous Causticizing System is extensively used. It has been adopted from the metallurgical industries to the paper industry. It furnishes a continuous method resulting in saving labor and power costs and in reducing losses in charging, agitating, decanting and washing.

Bleaching, in the early days, was done in a crude manner by passing the liquors through the paper engine and wooden or brick vats. Later, tanks arranged in series, through which the pulp flowed by gravity or was pumped, were employed.

#### Great Improvements in Chemicals

Great improvements were made in the processes for making chemicals used in the paper making industry. During the first century, soda ash, caustic soda and bleach were made by the LeBlanc process. The Solvay process was patented in 1861 and was used in many plants. The first Solvay plant to operate in the United States was built in Syracuse, New York, by Roland Hazard and William B. Cogswell, in 1881. In later years, the Ernest Solvay process furnished the bulk of the chemicals employed in the manufacture of paper. Its development, however, was as usual slow. Old prejudices were difficult to overcome. In 1883, a questionnaire was sent to the managers in the leading mills to learn their opinions of Solvay ash. The opinions varied. The conservatives were most numerous. Their opinions were summarized by one of them as follows:

"We tried Solvay ash for three months and lost money. We work so carefully that mistakes are impossible". It was that excessive care or timidity that was responsible for so many paper mills failing within a few years after beginning work. Business is always speculative. It prospers on experiments and venturing, it declines from the use of excessive care,



fear or conservatism. This applies to all forms of business. The history of the manufacture of paper shows that a large proportion of its failures were due to the management's reluctance to take risks when they were available.

The application of electrolysis in the chemical industry led to improvements and economies in the paper industry. The Little-Warren, The Carmichael, the Allen-Moore, Castner, Hargraves-Bird, Townsend, Larchar's, Nelson and other electrolytic cell processes were experimentally tried in the United States.

The recovery plants aimed exclusively at recovering the soda. It is well-known to works chemists that the spent liquors contain many other chemicals. Attempts have been made to recover other valuable products from them by electrolytic means and by fractional distillation. Some progress in this field has been made, more is ready for accomplishment. Today, little is known about the complex mixture resulting from the various reactions which occur during the cooking process. One difficulty experienced in the recovery is that waste products in the spent liquor are in diluted form. The solids amount to only 10 to 12 per cent of the total liquor weight.

It is shown that when the liquor is highly concentrated it has adhesive properties which have fitted it for use as a road binder, for a core binder in foundries and for briquette binding. It can be used also for sizing material for paper, as a tanning substance, and numerous other purposes. The possibilities for making drugs and fine chemicals from the liquor are indicated by the fact that analine and sulphur dye-stuffs have been obtained from it. Ethyl alcohol is secured from it by several methods now claiming attention. A yield of 95 per cent alcohol amounting to about one per cent by volume of liquor is easily obtained. Much has been done on these lines.

Another use for recovery material, which has been



THE ALPENA MILL, A PIONEER SULPHITE MILL

applied for many years in cruder forms, is in heating. While most attention has been given to the recovery of the chemical contents of spent liquor from the chemical processes of pulp making, engineers have experimented with the utilization of the thermal values efficiently. Steam is an essential requirement in producing chemical pulp. It is used in cooking for the concentration of the black liquor, in causticizing operations and for other purposes. Fuel savings can be secured by using the incineration of the black liquor in steam generation. The thermal value of black liquor is low. It is less than 33 per cent of coal. Its ash contents are about three times as large as that of coal. Its moisture content is always high. Nevertheless, the economic importance of the liquor fuel value has led engineers to conduct extensive experiments and they have demonstrated that when used in modern water tube boilers, recovered soda ash can be profitably employed for fuel purposes.

In glancing over the development of the chemical pulp processes we see how much their efficiency has been increased since they were first introduced and we can convince ourselves that finality has not been achieved. They are destined to play greater roles in the manufacture of paper. They will continue to assist in the development of the industry.

## CHAPTER VII

# The Development of the Sulphite Process

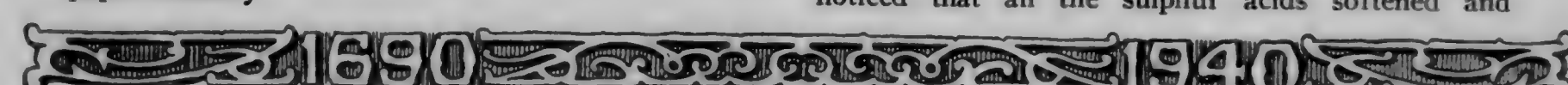
CHEMISTS have been busy making experiments since the Middle Ages. Many of their results were published. The majority of experiments, even many of a most interesting character, were never reported. Each year hundreds of thousands of inventions are made; but only an insignificant number are ever used in industry. Frequently principles in chemistry and mechanics are discovered and rediscovered. So, it was with the chemical processes now employed in the paper industry.

A patent was issued to a Frenchman, L. Piette, in 1830, for the use of a method of bleaching straw for papermaking with sulphurous acid. This is the earliest record of the use of sulphite of sodium in the paper industry.

Peter Claussen, an English inventor, was granted a United States patent for making straw pulp by soaking the straw in an alkali and treating the wet material with sulphurous acid gas. The patent was issued in 1851. There is no record of any commercial application of the process being made.

#### Tilghman, the Pioneer

It was the American chemist, C. B. Tilghman, of Philadelphia, Pa., who first drew attention to the value of the sulphite process. While experimenting with fats, he found that sulphurous acid attacked his wooden vats. The alchemists centuries before him had noticed that all the sulphur acids softened and





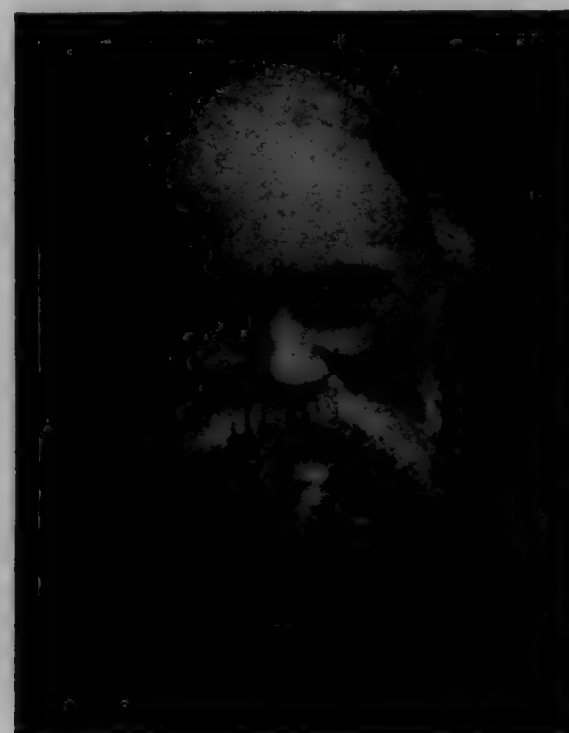


changed the color of wood. But Tilghman, knowing the difficulties that were being experienced by paper makers in securing supplies of rags experimented in making wood pulp. When he found he could secure a suitable pulp, he built a small wood pulp mill in the paper factory of W. W. Harding & Sons, Manayunk, Pa., in 1865. He used a water solution of sulphurous acid which formed sulphuric acid. The sulphuric acid broke down the fibers in the wood. To prevent that he added a solution of lime to the acid. He demonstrated the effectiveness of the sulphite pulp process and secured U. S. Patent No. 70,485 for manufacturing wood pulp by treating it with solutions of calcium bisulphite or other bases. This was the first American Patent for a commercially useful process. Mechanical difficulties impoverished the inventor.

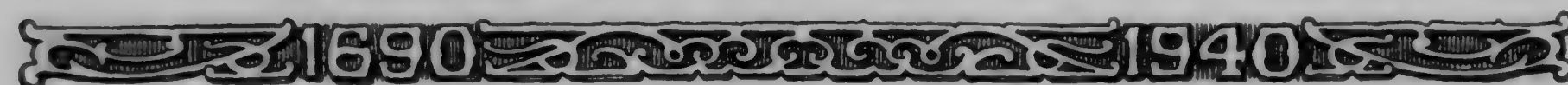
#### The Tilghman Patent Specifications

How well Tilghman employed the process is shown by his patent specification. It claimed:

1. The process of treating vegetable substances which contain fibers with a solution of sulphurous acid in water, either with or without the addition of sulphites or other salts of equivalent chemical properties as above explained, heated in a close vessel under pressure, to a temperature sufficient to cause it to dissolve the intercellular incrusting or cementing constituents of said vegetable substances, so as to leave the undissolved produce in a fibrous state, suitable for the manufacture of paper, paper pulp, cellulose, or fibers, or for other purposes, according to the nature of the material employed.
2. I also claim as new articles of manufacture the two products obtained by treating vegetable substances which contain fibers with a solution of sulphurous acid in water, either with or without the addition of sulphites or other salts of equivalent chemical properties as above explained,



BENJAMIN C. TILGHMAN



heated in a close vessel, under pressure, to a temperature sufficient to cause it to dissolve the intercellular or incrusting constituents of said vegetable substances, one of said products being soluble in water, and containing the elements of the starchy, gummy, and saline constituents of the plants, and the other product being an insoluble fibrous material, applicable to the manufacture of paper, cellulose, or fibers, or to other purposes, according to the nature of the material employed.

3. I also claim the use and application, in the manufacture of paper, paper pulp, cellulose, and fibers, of the fibrous material produced by treating vegetable substances which contain fibers with a solution of sulphurous acid in water, either with or without the addition of sulphites or other salts of equivalent chemical properties as above explained, heated in a close vessel, under pressure, to a temperature sufficient to cause it to dissolve the incrusting or intercellular constituents of said vegetable substances.
4. I also claim the use and application of sulphites or other salts of equivalent chemical properties as above explained, in combination with a solution of sulphurous acid in water, as an agent in treating vegetable substances which contain fibers, when heated therewith in a close vessel, under pressure, to a temperature sufficient to cause said acid solution to dissolve the intercellular or incrusting constituents of said vegetable substances.
5. I also claim the recovery and re-use of sulphurous acid and sulphite from the acid liquids which have been digested on the vegetable fibrous substances, by boiling said liquids or neutralizing them with hydrate of lime.

Tilghman digested the wood chips in lead-lined iron tanks. These were not found to be practical and the use of the process remained in abeyance for several years until other inventors improved its mechanical details.

#### Some Interesting History

R. B. Griffin and A. D. Little, the first American chemists to specialize in the chemistry of paper making, grew up with the development of the sulphite industry in the United States. In their work on the Chemistry of Paper Making, they give a clear account of the historical facts. The following is an abstract:

Tilghman is said to have spent about \$40,000 in experiments at a mill at Manayunk, Pa. He boiled in long ten-inch cylinders, lead lined. Although excellent fiber was obtained, the engineering difficulties proved so serious that the experiments were finally abandoned.

After the failure of Tilghman to put his process upon a commercial footing it was taken up by Fry and Ekman, at Bergvik, Sweden, about 1870, after a course of experiments in which nitric and various acids and water alone had been tried as resolving agents. In 1872, the present Ekman process, using



a solution of bisulphite of magnesia, was so far developed that these gentlemen had a three-ton mill running on a commercial basis with eight small jacketed digesters. The process was worked secretly until about 1879. It was introduced into England in a small way at Ilford Mills, near London, after which, in 1884, the proprietors of the patent erected a large mill at Northfleet, also near London.

Although in no way essential to his process, Ekman has always favored the preparation of this solution in towers. Those first used at Bergvik were five feet in diameter, fourteen feet high, and filled above the false bottom with calcined magnesia. They carried at the top sprinklers for distributing and regulating the flow of water.

The next to assist in the development of the process was Mitscherlich, then professor of chemistry at Münden, and a son of the celebrated discoverer of the law of isomerism. He began his experiments at the mill of F. Keferstein, Ermsleben, near the Hartz Mountains, about 1876, and later went to Thode's Mill, near Dresden. He did not get started on a commercial scale until about 1880 or 1881.

On the 11th of October, 1883, Moritz Behrend, the lessee of Prince Bismarck's mill at Coeslin, disputed the validity of the Mitscherlich patents. He relied chiefly upon the Tilghman British patent, No. 2924, dated Nov. 9, 1866. After a very long trial and examination of technical experts, the German Board of Patents concluded that the Mitscherlich process did not differ from that of Tilghman sufficiently to entitle it to protection.

Francke, in Gothenburg, Sweden, began his experiments about 1879, his attention, it is said, being turned in this direction through the introduction to him of one of Ekman and Fry's chemists. He began work in a commercial way about 1882. His process secured no foothold in this country, and presents few points of interest. The liquor is prepared in towers, and the digester is a horizontal rotary cylinder, lead lined. The lining is held in place by rings of various construction.

The Partington process, which was acquired by the American Sulphite Pulp Company, about 1884, was one of the first to be introduced here. The liquor plant shows a radical departure from those previously used. The digesters are spherical rotaries. The various steps taken by Partington in the development of his system for lining these digesters comprise one of the most interesting studies in engineering which the process has shown.

McDougall was for some time associated with Partington, and his plant in 1887 differed little from the last described, except in the method adopted for lining digesters.

#### Graham's Process

Various other manufacturers in different parts of Europe started almost contemporaneously with these workers. Graham in England, who had been chemist to Ekman and Fry, applied to digester linings a method by which the lead was caused to adhere uniformly over the surface of the iron shell, and worked



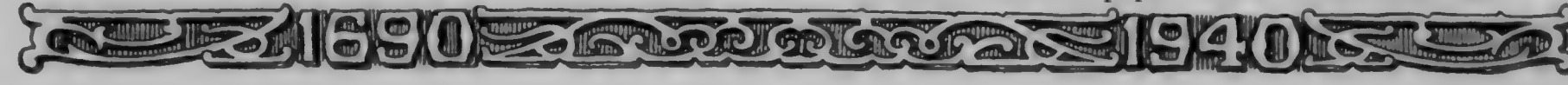
MARTIN NIXON

out a special modification of the Ekman process. It consisted in reinforcing the strength of the boiling liquor during cooking by fresh charges of gas. Graham's process has not come into practical use, but the digester was adopted by Ekman, and by some mills in this country. Flodqvist for a time exploited the process in which a liquor containing both bisulphite and phosphate of lime was used, the liquor being made in a series of towers, some of which were packed with limestone and others with the bones which furnished the supply of phosphate. Kellner in Austria, was at that time associated with Baron Ritter. He was one of the most skillful chemical engineers who turned attention in this direction. He had taken out, in 1885, several patents covering a special process, liquor apparatus and digester, which were then in successful operation.

The difficulties occasioned by the use of an acid sulphite had, as early as 1880, led Cross to bring out a process employing an alkaline solution of sulphite of soda in iron digesters, unlined. This reagent has no effect on the iron, but its use necessitates the carrying of considerably higher pressures than where the bisulphite is used, the bleaching action of the sulphurous acid is much restricted, and the cost of chemicals much increased. There is, moreover, according to experiments, a precipitation under these conditions of free sulphur throughout the pulp. The Pictet-Brelaz process, which was brought out in 1883, goes to the other extreme. Instead of increasing the amount of base, as Cross had done, it does away with it altogether, the wood being boiled at a temperature never exceeding 105 deg. C., in a solution carrying from 7 to 8 per cent sulphurous acid.

#### Charles S. Wheelwright Introduces Process

The first American paper maker to introduce the







process upon a commercial scale in this country was Charles S. Wheelwright, then of Providence, R. I. The Ekman process was the modification selected, after a visit, in 1882, to the small mill in which it was in operation at Bergvik, Sweden. Although the process as there shown was evidently very imperfect on the mechanical side, the high grade of the product encouraged Mr. Wheelwright and his associates to erect, on a large scale, the now historical plant of the Richmond Paper Company.

Pulp of the highest quality was made almost from the start; but the mechanical difficulties of working the process on a large scale proved so serious that in spite of his untiring energy, Mr. Wheelwright soon found himself in almost the position of the original inventor, Tilghman.

The towers filled with calcined magnesia, as was the case at Bergvik, gave endless trouble. It was due to the difficulty of regulating the flow of water, from the great tendency of the magnesia to soften up and form mud, and finally, from the liability, when the water supply was temporarily stopped, of the whole mass to cake and bind together through the formation of monosulphite of magnesia. These defects in the apparatus frequently made it impossible to secure regular or free draft up through the tower, the output of liquor was small, and both its quantity and composition were irregular. After trials on a large scale, with many different forms of apparatus, those difficulties were entirely overcome by the adoption of the apparatus suggested by Catlin. Obstacles equally serious were encountered in working the digesters, as the engineering problems presented were such that no precedents could be found for guidance. Various forms of digesters were designed in succession by Mr. Wheelwright to such good effect that the cost of repairs on linings were in about three years reduced from over \$10.00 to about \$1.50 per ton of product. Throughout all this period of difficulty the product of the mill was equal, if not superior, to any which has since been produced here or abroad.

Except in a few instances which will be noted, the subsequent developments of the process in this country has proceeded upon the lines laid down in Europe, although numerous forms of digesters and liquor apparatus have appeared. Two new systems, those of Schenck and Crocker, have been developed commercially, and the former has been widely introduced. The main novelty of the Schenck process is found in the digester, which is built up in three-foot sections cast from a special bronze. His liquor apparatus differs slightly from that of Partington, and the general method of procedure in the process itself is much the same. The Crocker process differs from all those before mentioned in that it employs a solution of bisulphite of soda prepared by double decomposition on treating bisulphite of lime solution with sulphate of soda.

#### The First Sulphite Mill in U. S.

The first sulphite mill in the United States to operate successfully on a commercial scale was built in

Alpena, Mich. in 1887 by G. N. Fletcher. It was a Mitscherlich mill. The construction was supervised by August Thilmany who secured the American rights of the Mitscherlich patents in 1885. These rights were sold for \$250,000 to the International Sulphite Fiber and Paper Company, Detroit, Mich. That company charged a flat royalty of \$10,000 to each mill employing the process. The Sulphite-Fletcher Paper Company at Alpena closed in 1940.

In the early days of the sulphite process, operators found difficulties in preparing the wood for the digesters. The wood was cleaned by hand, the knots were cut out and the logs were cut into small discs that were hand-charged into the digesters. This was slow and costly. An improvement was made when the hand-cleaned logs were sliced into uniform sized chips by a guillotine axe. Subsequently slasher saws, barking drums, splitters, and high efficiency chippers were developed.

The development of the acid plant was the most difficult problem faced by the pioneers. Griffin and Little's account shows how the inefficient, evil smelling, hard-in-handling acid chambers were gradually improved.

Endless difficulties were experienced in the early days in constructing digesters which would withstand the solvent action of the sulphur acids. Iron digesters are corroded and pitted in less than six months. Within a year or two, they must be replaced.

Experiments showed that lead is the only metal that resists the corrosive effects of the soda acids, and lead possesses certain physical characteristics which are undesirable. The resistance of lead is due to a protective coating of lead sulphate over its surface which completely resists the action of the sulphite liquor. But lead has a coefficient of expansion which is more than double that of iron or steel. This results in the lead tearing away from steel when the two metals are together and the temperature is increased. Besides, lead, when expanded by heat, unlike most metals, fails to return to its original dimensions. Consequently, when iron and steel digesters were lined with lead, the lining "crawled", buckled and pulled away from the steel shell of the digester. In the course of time, this action of the lead lining results in cracks, pitting and tearing of the lining with corrosion of the iron.

#### Much Ingenuity Manifested

Much ingenuity was manifested by inventors in overcoming the decaying of lead linings. Some tried to make use of lead alloys. It was discovered that small quantities of antimony, tin, or copper alloyed with lead improved its contraction qualities.

One of the earliest patents for antimony-lead linings was that of Frank. The alloy was cast in half-circles which were placed in position within the steel digester shell and melted together into a solid lining. A later patent of Frank's covered the use of brass with lead. The rings were cast of brass and covered with lead. A further improvement was made by casting the brass rings in three segments which were



kept in position by tightening wedges made of lead covered brass. When the lead covering of the rings diminished in thickness by wear, the lining was tightened by hammering the wedges. Experience showed that the constant tightening of the rings squeezed the lead away from the lining and this necessitated constant repairs. Better results were secured by making the rings of wrought iron strips about two inches wide that were cut into half circles and sprung into place within the digester. The rings were placed a foot and a half apart and covered with lead which was burned on within the digester to form a continuous surface.

Partington, patentee of the globe shaped rotaries, cut the lining out of spherical triangles of iron which he covered with lead. The lining was held to the steel shell with large-headed bolts. The bolts were lead covered and the lead was fused into a whole.

Makin patented a lining made of thin sheet iron boiler plate perforated with half-inch holes. Lead was cast over the plate and filled the perforations. Numerous modifications of this lining were made to overcome working difficulties.

Springer modified the Partington lining by allowing spaces to remain between adjacent edges of the lining sections. The Ritter-Kellner lining was of iron covered by lead with lead rings sunk in the digester walls. The interior surface, when the rings were in place, was covered by lead sheets which were fused into a solid mass.

The Ekman, a Swedish invention, had recesses in the steel shell into which fused lead was forced. This construction was a fertile source of repairs and the patents earned no profits in the United States.

Wheelwright's linings took the place of Ekman's. The inventor built this digester of cast-iron rings, 7 feet in diameter and 2 feet high. There were ten rings and the digester had cast-iron cones at top and bottom. The inner wall of each ring was ingeniously curved outwardly towards the flanges. This tended to cause the lining to bed itself on convex curves while expansion was neutralized by expansion through the flanges.

So much trouble was given by lead-linings, that experts sought how to make linings from bronze. These were a little more satisfactory, but in time, corrosion appeared in the lining. Pitting, on numerous occasions, led to serious digester explosions. These led to the fitting of Clapp and other safety-valves to digesters.

The Mitscherlich digester was the first to use bricks for a lining. It was a German invention which gained much attention, a brief popularity and a short life. It was built of steel cylinders about fourteen feet in diameter and forty feet in length. The interior of a cylinder was coated with tar and pitch which was employed as a cement to hold a lining of sheet lead. The lead was covered by two-courses of a special acid-resisting brick interlocked by tongue and groove. Piping measuring 2,000 feet was coiled within the digester to steam heat the contents. Great efforts were made to improve the efficiency of this process, but without avail. The operations proved to

be too long, often requiring as much as sixty hours. The copper heating coil constantly leaked and called for repairs which led to the closing of the digester. The lead pipes attracted deposits of calcium monosulphide which, when heavy, dropped into the pulp and injured it. Overcooking occurred, when the wood chips were in contact with the copper heating pipe coils.

Numerous other factors worked against the extensive use of the Mitscherlich Process, but it is not without certain beneficial attributes that make it desirable in some factories. It makes a characteristic, strong pulp which is not matched by any other method. It does not consume much sulphur and a weak acid can be used. Where these are desirable conditions to be met, the process may prove satisfactory.

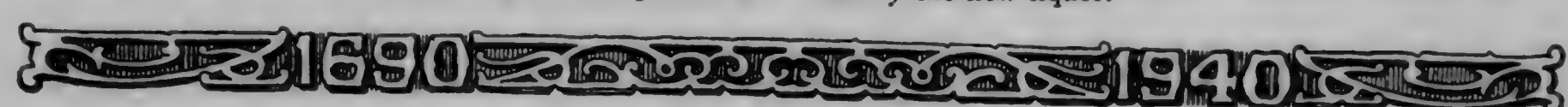
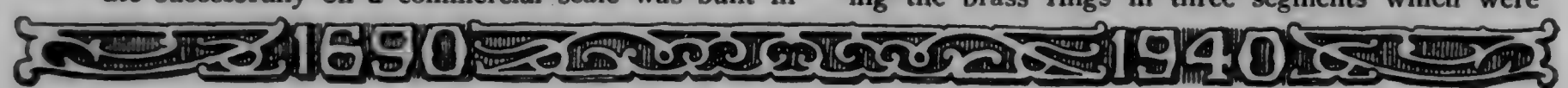
An accidental observation made in 1883 by a chemist resulted in the patenting of the Solomon Brungger digester in Germany. When bronze coil repairs in a Mitscherlich digester were necessary, Brungger used iron coils instead of the bronze ones. At the end of the cooking, he saw that the iron coils were coated with a thin dense scale of lime sulphite that prevented corrosion. He experimentally found means for coating the whole of the interior of the digester with a film of the sulphite. This was patented and was known as the Solomon-Brungger digesting process.

The Jung & Lindig process used a lining of a double silicate of iron and lime which was covered with a protective shield of silicate of lime. Other chemical linings were tried and many had advocates. Deposited linings were made obsolete when cement linings were tried. Wenzel, in Germany, was one of the pioneers in cement linings. He covered the interior of a digester cylinder with metal lath which was covered with Portland cement. In 1890 Kellner and others took out international patents for cement linings put on in plastic condition, or cast as rings, blocks or slabs. The Portland cement was mixed with powdered slate, glass and other materials. Kellner was the first to use and patent glass linings. The glass was cast in slabs, or rings, to fit the digester. Russell discovered that a cement and sand mixture did not hold up. The Alkali and acids attacked the sand. He found pure Portland cement made a better lining. Cement linings are porous when new. After a few cookings they absorb coatings of lime sulphate and sulphide.

Brick and tile were used to protect cement linings. They proved efficient and linings of brick and tile alone were tested and found to be practically useful.

The chief objection to cement, brick and tile linings is that they do not provide a covering of uniform thickness. Where there are thin, porous spots, acid penetrates and corrodes the steel plates.

The bisulphite liquor used in the digesters is prepared by (1) burning pyrites or pure sulphur; (2) absorption of the resulting sulphur dioxide gas in a solution of lime in water and (3) adding the sulphur dioxide recovered from the previous cooking to fortify the new liquor.







## CHAPTER VIII

# Sulphate Process Makes Appearance

THE soda process was modified in 1884 by C. F. Dahl, a chemical engineer of Danzig. He sought a means for reducing the cost of the soda process and discovered that by using salt cake, or sodium sulphate, in place of the costlier soda ash, he not only got a cheaper pulp, but also one with long, strong fibers. It was a better process than the older soda method. There were enormous heaps of saw-mill refuse in the forests of Finland, Norway and Sweden which were suitable for treatment by this new process. The refuse was secured by paper manufacturers. Dahl's process was used in converting it into paper. This activity led to an extensive development of the process, on account of the low cost of paper made by it in the early days through the relatively low price of the salt cake and refuse. Later, when the refuse reserves were used up, there was a reaction to the process on account of the foul odors it made. Carl Carlson, a Swedish engineer, observed that when the pulp is cooked in a closed digester under pressure, the odor nuisance could be greatly minimized. He patented the idea, built a plant and received orders for the construction of mills in Europe and the United States.

### Sulphate Mills in Europe

Sulphate mills were largely developed in Europe in 1886. Carlson had built and operated the Oerebo and Langbrun mills in Sweden. Here he demonstrated the value of the process to European mill men and those mills became the centers of pilgrimages of American paper manufacturers who "wanted to be shown that the process worked before they would put money into it." This conservative attitude enabled Canada to secure the honor of building the first sulphate mill in America. In 1908, the Brompton Pulp and Paper Company, which was formed in 1903, had a sulphate mill in operation in East Angus, Quebec, Canada in 1907.

The president of the Central Paper Company, Muskegon, Mich., visited Carlson at Langbrun, Sweden, in 1908, to study the sulphate process. He became enthusiastic and said he was convinced that in the future it would be the basis of the American wrapping paper industry. A contract was made with Carlson for the design and construction of a sulphate, or kraft mill, in Muskegon. This was the first to operate commercially in the United States.

The digesters and diffusers in the Central Paper Company's mill were made by Julius Pintsch & Co. in Berlin, Germany.

The first sulphate pulp made in the United States appears to have been obtained in an experimental mill in Pensacola, Fla. in 1903. It was built and operated by Smith & Thomas as a sulphite mill and

it was changed to sulphate by their chemist, Edward H. Mayo.

The first commercial mill to manufacture sulphate pulp in the United States it is stated was that of the Roanoke Rapids Paper Manufacturing Company, Roanoke Rapids, N. C., which went into production on February 26, 1909.

### First Sulphate Pulp in U. S.

The records however concerning the priority of the establishment of the United States sulphate mills are not clear. There is no doubt that the honor belonged to either the Muskegon or the Roanoke. The engineer who constructed the Roanoke said that the first cook was blown in on February 26, 1909. Mr. E. Meurar, president of the Central Paper Company when the Muskegon Mill was built, published an article in the PAPER TRADE JOURNAL in which he stated that: "We ordered our digesters from the well known firm of Julius Pintsch & Co. of Berlin, Germany, and began our construction work in 1908. We produced the first kraft pulp in the United States in the summer of 1909". From this it appears that the Roanoke Mill was the first to be constructed for the sulphate kraft process and the first to make sulphate kraft pulp. Its output was on the market about three months before the Muskegon's. Roanoke has another great distinction. It was the pioneer kraft mill to demonstrate and utilize southern pine.

An interesting story is related about the building of that famous mill by the late Joseph H. Wallace, a distinguished American engineering chemist and a leading paper mill consultant and builder. He was called to England to design and build several large paper mills and while there heard about Carl P. Carlson's improved sulphate process. He went to Sweden in 1908 to investigate it. He had an entertaining journalistic writing style and has left us some notes relating to the establishment of the Roanoke mill that are worthy of being quoted. He wrote: "We invaded Norway and Sweden. Crossing the North Sea from Hull to Christiania (now called Oslo,) we encountered gales that rocked the little steamer so that nobody could eat. Our trip through Norway included visits to Moss where we saw our first sulphate mills in operation: Sarpsborg—the Kellner Partington Mills; Skotfos—the big Union Mills; Drammen, where Swenson and Ryberg were operating the first glassine and grease-proof products we had ever seen; then Katfos—Mjondalen, Gjethus, Lillestrom, then north over the mountains to Trondjhem, the most glorious trip one can have in the summertime.

### Testing Plants for Sulphate

"While buying lumber for the mills we were build-



ing, in Europe, we came to the lumber mills at Savannah, Ga. and noted the waste burners all over the harbor. And there is where we fell! That observation and what followed have moved the wrapping paper business to the South. Barrels of this refuse went to New York. Miniature plants for testing it out for sulphate treatment were built—discarded—built again—again discarded and again built. Barrels of the material went to Sweden where Carl P. Carlson was the wizard of the sulphate mill. And in 1907, at Copenhagen, in Denmark, we met Carlson to discuss Southern pine possibilities.

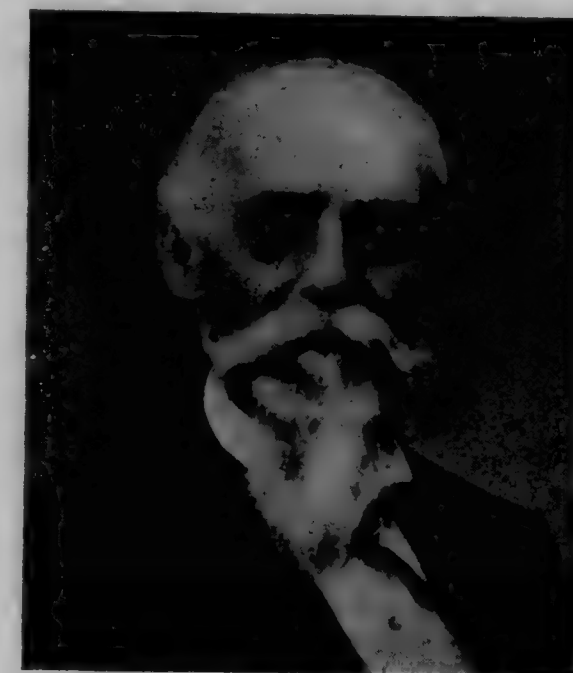
It was on that momentous occasion when Carlson became our associate in designing the first Southern sulphate mill in the United States—namely the mill of the Roanoke Rapids Paper Manufacturing Company at Roanoke Rapids, N. C. We bought digesters and diffusers from Julius Pintsch, A. B., Berlin, Germany, where we noticed that some undersea boats were also being made—this at the Pintsch shops at Farsstenwalde, near Berlin.

"Roanoke Rapids, N. C., was some place. We were engineers for a paper mill, ground wood pulp and sulphate fibre mill for Roanoke Rapids Paper Manufacturing Company—a power station and concrete dam for Roanoke Rapids Paper Company, and a board mill for Roanoke Rapids Fiber Board Company, all at one period.

The second sulphate mill built in Canada was owned by the New Brunswick Pulp and Paper Company, Millerton, Miracichi, N. B. The machinery was made in England. Although the corporation was registered under the Canadian laws, the capital and management was British.

### Yellow Pine Yielded Excellent Pulp

The Pensacola experiments in making pulp from Southern pine were duplicated in 1907 by Herbert S. Kimball, a well known chemical engineer. He stated that the Carlson process was well suited to the



D. E. MEAD





### Opposition to the Process

This statement reflects several interesting side lights on the chemical treatment of wood pulp. There was opposition to it as there is to every new invention. The opponents made many reckless statements. But allowance should be made for the fact that in the early years of the industry insufficient knowledge of the chemistry of the sulphate process was possessed by mill managers to cope with chemical problems. All sulphur gases have disagreeable odors which modern chemistry enables us to destroy or neutralize. While threatened legislation in Europe looked to destroy the sulphate industry, one of the greatest and most beneficial of its day, American mill men were not frequently restrained. This was due to the fact that they entered the field later than the Europeans and their chemists were able to utilize European discoveries in neutralizing objectionable chemical odors. The problem, however, has to be met in some mills.

Provided the cost of treatment can be met, there are numerous chemical and mechanical means for abstracting gases. Experiments with sulphate gases showed that, when they are cooked with disodium phosphate ( $\text{Na}_2\text{PO}_4$ ), odors completely disappear. The charge is phosphate equivalent to 0.5 per cent of the weight of the wood. Similar results may be obtainable by running the liquor over a drying tower. Sometimes the steam and gases blown from a cook are condensed. This was done in the Muskegon Mill, Mich. Water sprays also dissolve and carry away the gases. Extensive American medical investigation confirmed those shown in Sweden—that odors from sulphate mills being injurious to public health is completely without any scientific foundation. In the localities of many American mills the health authorities report improvement in public health resulting from better living conditions that are promoted by the mills.

### Experiment to Improve Chemical Processes

Many experiments were made to improve the chemical pulping processes. It was observed that in many pulp mills care is taken to produce pulps of the highest quality which are used for mixing with lower quality ground wood pulp. In 1923, the Forest Products Laboratory developed a semi-sulphite process which reduces cost and time of cooking. It consisted in regulating the temperature, concentration, time and ratio, of acid to chips so that the wood is only softened at the end of the reaction. The softened chips are blown from the digester, washed, and then fed to a mechanical disintegrator for reduction to pulp. The pulp obtained by this treatment can be utilized for many purposes the best pulps serve. It has been used in newsprint, wrapper and other papers.

### Semi-Chemical Process

The advantages claimed for this semi-chemical process were:

1. It supplies the means for securing a high yield

of pulp suited to newsprint and similar papers. Hemlock, spruce, hardwoods and mixtures can be used.

2. The yields can be varied easily from 40 to 50 per cent above those in older processes.

3. Cooking time is largely reduced because a complete cooking is unnecessary.

4. A maximum bursting strength of a point per pound per ream is secured for the pulp.

5. Screenings are eliminated.

6. There is an appreciable saving in costs.

The scheme employed in this process can be modified in many ways so as to be made adaptable to many needs. As long as the chemical methods of pulping are in use semi-chemical processes will be tried.

The soda, sulphite and sulphate processes for making wood pulp are among the outstanding inventions of modern times when the value of the great industries that are based on them is considered. They are not final, but trail blazers in a field that has enormous possibilities. Already chemists have demonstrated the promising qualities of other chemical processes. To suggest the scope of the untitled fields, the Mason steam defibering process can be considered.

### W. H. Mason Invents News Process

W. H. Mason, a consulting engineer, was engaged in the early "twenties" in perfecting a process for extracting rosin and turpentine to recover those valuable by-products. Traveling in the Southern States he saw the great waste occurring in the saw mills in the lumber districts. He believed that the waste wood could be reclaimed and converted into pulp suited for making paper. He began his experiments in the spring of 1924 in the mill of the Wausau Southern Lumber Company, Laurel, Miss. He rejected chemical treatment of the wood on the ground of expense. Dealing with cheap material, the treatment had to be inexpensive. The problems to be solved was to separate the wood fibers and to save the lignins. He knew that wood softened when subjected to heat and moisture. Reflecting on this he thought that steam alone might offer a solution. How the solution was consummated is best told in Mr. Mason's own words:

"It occurred to me that wood being plastic when subjected to heat and moisture, and this plasticity probably being due to some change in the lignins under those conditions, it might be possible to soften the lignins and blow the fibers apart with the same steam that had been used to soften the wood.

"There were four phases of this problem to be considered.

1. Application of temperature and moisture in such manner as to soften the lignins more than the cellulose fiber.

2. Means of releasing the steam practically instantly.

3. Application of the temperature in such manner as not to mar or deteriorate the fibers.

4. The degree of pressure that would be necessary to disrupt the fibers at the time the pressure was

removed.

"The question of a working pressure came first. I knew it could not be done with 150 to 200 pounds, but just how much pressure was required I hadn't the faintest idea.

"At that time—in the spring of 1924—I had a turpentine extraction operation at the plant of the Wausau Southern Lumber Company at Laurel, Miss. My experimental plant was in an old shed adjoining the sawmill plant, and my first steam gun was a piece of old shafting some three inches in diameter and about fifteen inches long.

"In one end of the shafting we bored a hole, which was enlarged inside the cylindrical form to a dimension about twice as large as the size of the neck through which the boring was made. In one side of the shafting another small opening was drilled and a brass cup fitted on the inside of the cylinder and filled with oil, so as to make thermometer readings possible.

"The outside of the gun muzzle was tapered to a ground valve joint and the valve was held in place by a round-necked pin, supported in turn by a yoke surrounding the gun and bolted to the breech.

"The gun chamber was filled with chips and water, the valve placed in the breech opening, and the pin drawn back against the valve by tightening the bolts in the rear of the gun, holding the yoke firmly against the pin.

"Two gasoline torches were then directed against the side of the gun until the temperature on the inside rose to 480 degrees Fahrenheit, indicating a pressure of approximately 600 pounds. A four-foot long bar was placed with one end against the pin and a sharp blow with a hammer on the other end of the bar knocked the pin loose and allowed the valve to blow out.

"The first experiment with this makeshift gun was a complete success, so far as the defibering of the chips was concerned, although it took a long time to find the valve. The principle of steam explosion had been demonstrated at the first trial; for the rest it

was a matter of continual experiment to establish the best working pressure and proper degree of temperature and time.

"For some weeks this experimental gun was used, during which time different kinds of wood were discharged from the muzzle, at varying pressures. We even tried to make white wood fiber, but there was always some darkening caused by the steam. Subsequently, two other experimental guns were constructed, in which pressures as high as 900 pounds were utilized. It was determined that the time element was just as important in exploding the chips as the steam pressure and temperature inside the gun.

"In present practice we subject the chips to a low pressure of 200 pounds for from 10 to 15 seconds, and then to a pressure of 1,000 pounds for from 3 to 5 seconds, before blowing them from the gun. This softens the lignins without damaging the fiber. We can apply the higher pressure direct for 6 seconds and obtain complete separation of the fiber, but the resultant pulp is not as good.

"Having worked out a method of defibering the sawmill wood waste, the next step was to find the best product to be made from the raw material. I took some of the fiber to the plant of the Bogalusa Paper Company at Bogalusa, La., where it was beaten up and made into a small sheet of paper by hand. The result did not look very good, so that attempt was dropped and another use sought for the material."

The experiments showed that by steam alone paper pulp can be made simply, inexpensively and quickly. This was an epoch-making discovery which will play a great role in the future. The experiments disclosed that in addition to paper, numerous products of commercial value can be made by the process. The inventor decided to utilize it for manufacturing presdwood, a hard durable board of high tensile strength. Another use of the exploded wood was for making insulating board. The Mason process does not call for high power costs, an expensive chemical plant, a loss of a high percentage of fibers, as in chemical processes, nor does it destroy, shorten or weaken the

## CHAPTER IX

# Remarkable Industrial Expansion

THERE was a remarkable impetus given to industrial expansion at the end of the nineteenth century. The movement was world wide and the outcome of the utilization of profits accumulated during the previous half-century. The development of transportation opened up new markets, inventions led to the establishment of new manufactures, bankers drew deposits from wide sources and a general feeling of prosperity caused them to search for new investments for their funds. Beginning in 1897 and continuing until about 1920, capital was applied to

the leading industries in greater amounts than in any previous epoch. The paper industry benefitted by this movement and some of the largest corporations manufacturing paper in America originated in that great era of investment.

### International Paper Co. Formed

The International Paper Company was the most outstanding of the period of consolidations. It was organized under the laws of New York, in 1898,



with a capital of \$55,000,000. This was divided into \$25,000,000 preferred and \$20,000,000 common shares and \$10,000,000 in bonds. It owned thirty-four of the largest mills in the Eastern States and many of the best water power sites. Woodlands were acquired in Maine, New Hampshire, Vermont, Massachusetts, New York and Ontario. This organization possessed the capacity to manufacture in quantity any type of paper product.

The American Writing Paper Corporation was organized under the laws of New Jersey, July, 1899. It was capitalized at \$39,000,000 comprising \$12,500,000 preferred and \$9,500,000 common shares and \$17,000,000 bonds. This company was reorganized under the laws of Delaware, January 28, 1937. When first organized, the company owned twenty-two mills with a daily capacity of 828,000 pounds of paper. The present capacity is 504,000 pounds.

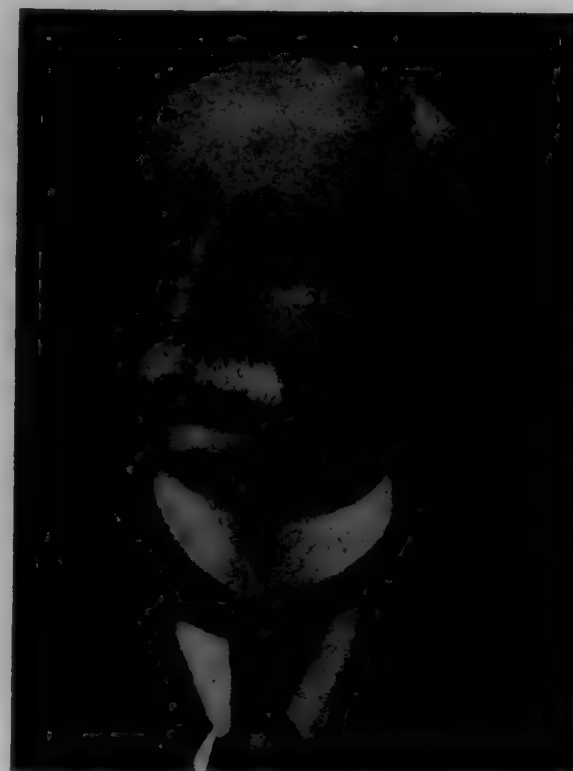
The Great Northern Paper Company was organized in 1899 with a capital of \$14,000,000. The West Virginia Pulp and Paper Company was reincorporated in 1899.

Among the large corporations that came into being after 1900 were: the St. Croix Paper Company, \$2,500,000; the Finch, Pruyn & Co., \$3,000,000; the consolidation of the Columbia River Paper Company and the Crown Paper Company as the Crown-Columbia Pulp and Paper Company, \$1,000,000; the Champion Fibre Company to build a pulp mill in North Carolina, \$1,000,000; the consolidation of the Bryant Paper Company, the Imperial Coating Mills and the Superior Paper Company into the Bryant Paper Company, of Kalamazoo, Mich.; the consolidation of the Tytus Paper Company, the Gardner Paper Company and the Middletown Paper Bag Company into the Tytus-Gardner Manufacturing Company, \$1,000,000; the consolidation of the Nekoosa Paper Company, the John Edwards Manufacturing Company and the Port Edwards Fibre Company into the Nekoosa-Edwards Company, \$3,000,000. The Bryant Paper Company's capital of \$3,000,000 was increased to \$6,500,000 in 1916.

The fortunes of the large companies followed the



WILLIAM H. PARSONS



J. A. KIMBERLEY

courses of the business cycles. Some of them were reconstructed and some failed to continue operations. There have been criticisms of large corporations, but there is no doubt that those operating in the paper industries have exerted powerful influences to the benefit of the industries. Only large aggregations of capital could have furnished America with the magnificent mills and paper resources it now possesses.

#### The Pacific North West Expands

The Pacific North West has long been celebrated for its forests and extensive lumbering operations. It was only natural for paper manufacturers to study the possibilities of utilizing the forests for paper making. Although mills were established at a much earlier date, a rapid expansion of the industry in this section began about 1925. The pioneer mills were built in Washington, Oregon and British Columbia. News and book papers were produced from hemlock and spruce logs.

The Pacific Coast mills produced 2,045 tons of all grades of pulp daily in 1923, and 7,638 tons in 1938. There was an increase in the daily production and consumption of pulpwood and pulp in the sixteen years of over 274 per cent. The daily production of all grades of paper and board was in 1923, 2056 tons and in 1939, 5,446 tons. This shows an increase of 165 per cent. These figures indicate the healthy trend of the West Coast industries.

#### Field for Continued Expansion

The field for the continued expansion of these industries is unlimited. The U. S. Forest Service estimates that the States of California, Oregon and Washington, contain one-half the saw-lumber and about 30 per cent of the pulpwood remaining uncut. As most of the North West Coast forests consist of trees suitable for pulping, the pulp wood reserves of the three western states are more than half as

large as the reserves in all the other states. They are among the greatest of the world's reserves.

The trees are tall and grow vigorously on the sides of the great mountain ranges, in the numerous valleys and along the rivers. They consist mainly of Douglas fir, hemlock, white fir, Silka spruce, yellow, white and sugar pines. The species are confined to growth on the western coast. The Silka spruce is one of our finest pulpwoods and it is less numerous than other western forest trees. It has often been proposed to use it extensively in reforestation. Climatic conditions are so favorable to reforesting work on the West Coast that little trouble would be experienced in laying out extensive and very valuable spruce lands. By proper reforestation, the quality and quantity of the forest products could be improved in an astonishing degree. This would be particularly so if a Luther Burbank could be found to plan and supervise the work.

#### Economic Conditions Good

The economic conditions of lumbering, transportation and marketing on the Pacific slope are good. Labor is slightly higher than on the East Coast and it is not always in good supply. In normal business times, unemployment is rare on the West Coast.

The markets for the Pacific Coast paper and pulp mills are in the Middle Western States, on the Pacific Coast of South America, in Australasia and

Asia. These are markets that promise to expand largely in the future.

The paper and pulp industries are now well-established on the Pacific Coast both in the United States and Canada. Many of the mills are large and of the most up-to-date design. The growth of the industry is rapid and sound. There can be little doubt that it will go far in its development.

Recent developments show that the Pacific Coast pulps are highly suitable for converting into textile fibers. Several large mills prepare pulps, marketed as dissolving pulps for the textile and cellophane industries. The improvements being made in textile, plastic and other machines for working up wood pulp are so effective that each year demands increase for finer pulps. These improvements are certain to increase the production of pulp on the Pacific Coast. Some companies producing pulps for textile purposes are operating plants in Washington, Oregon and in the Southern States. They find few variations are required in the technique in converting pulp into rayon, artificial wool, cotton and other materials. Some chemists believe that the use of wood pulps for plastics, textile fibers and cellophane, and similar materials, will make a revolution in the pulp industries similar to that which occurred in the paper industries when wood pulp was substituted for old rags as a source of fibers.

## CHAPTER X

# The Great Development in the South

ONE of the most rapid and astonishing developments in the modern paper industry began in 1930 in the Southern States. In Colonial times, they were noted for their great forests and they have long been producers of lumber, turpentine and rosin. In 1810 there were about twenty-five paper mills operating in the Southern States. They were rag mills and are now chiefly interesting for indicating that paper making is not a new Southern industry.

Pulp and paper were made in a number of mills in the South from local pine after 1909, when the sulphate process was started to Roanoke Rapids. This movement was however greatly accelerated about 1930 by the promotional work of Dr. Charles Holmes Herty, a distinguished chemist who had long investigated processes for extracting turpentine and rosin from Southern pine. Dr. Herty, through his perseverance and technical skill in developing the use of Southern pine for the manufacture of all types of paper, was almost directly responsible for one of the greatest industrial and agricultural transformations in the history of the South. This was his pet project, but he already had placed the nation in his debt through his work in making German vat

dyes available to American manufacturers during the World War, and in his research which led to the revolutionizing of the turpentine industry.

#### Southern Pine for Paper Manufacture

Dr. Herty had been convinced of the value of Southern pine in the manufacture of paper for a long time, but it was not until eight years ago that he got his opportunity to prove his premise. In 1932 he became director of the division of pulp and paper research of the Georgia State Department of Forestry and Geological Development, and this led to the establishment of a laboratory in Savannah in which he perfected his processes.

Southern slash, or yellow pine had been used for years for the manufacture of kraft, but the makers were not convinced that there was enough pine in the South to warrant the building of more mills.

Dr. Herty was convinced that not only was there enough pine, but that a steady supply could be maintained. He was thinking of the development in terms of new industries for the South and new opportunities for Southerners, and his research proved he could supply both.

He produced white paper and newsprint which



could be made at a considerable saving. He carried his experiments further and found he could make newsprint from black gum wood. His work with the pine trees produced a fatty by-product useful in the manufacture of soap, and his work with the gum trees disclosed a new source of rayon.

#### Contribution to Turpentine Industry

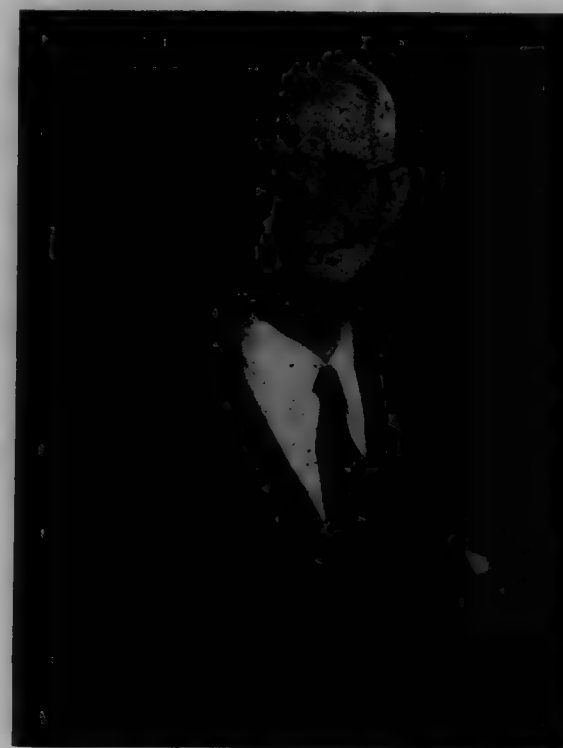
Dr. Herty's contribution to the turpentine industry was made early in the century, when he was a professor of chemistry at the University of North Carolina. He was interested in the Southern pine then as a source of naval stores. Turpentine operators at the time always hacked deep into a tree to make a recess or "box," which would gather about a quart of turpentine. The trees were being killed and Dr. Herty decided that something should be done.

His investigations showed that turpentine normally was not contained in the tree. The liquid was manufactured naturally when the inner bark was wounded. Thus he discovered not only that the deep slash was not necessary, but that the tree produced about 25 per cent more turpentine if only the inner bark was bruised. He developed the turpentine cup which was nailed to the tree. It is now in universal use.

Dr. Herty was born in Milledgeville, Ga., on December 4, 1867. He studied at the University of Georgia, from which he was graduated in 1886, and four years later he received his Ph. D. from Johns Hopkins University. After studying abroad for some time he returned to Georgia to teach for two years, after which he served with the United States Bureau of Forestry for several years. Dr. Herty died in Savannah, Ga., on July 27, 1938.

#### The Southern Forests

The southern forests are composed of slash, loblolly, longleaf and jack pines. Many other trees are available. Dr. Charles Carpenter, formerly of the



DR. CHARLES HOLMES HERTY

Herty Foundation Laboratory, reported that swamp black gum and cotton wood trees yield mechanical pulps of good color and up to 65 brightness. In carrying out viscose experiments, he demonstrated that swamp black gum, red gum and cottonwood, treated by the sulphite process, showed much promise. The hardwoods pulp and bleach more readily than pine. He predicts that in the future young pines will supply cellulose for the highest grades of viscose yarns and the pulping hardwoods will become sources for cellulose like staple fibers. The salvation of cotton growers promises to result from compensatory activities in securing southern pulp woods for the manufacture of rayon and similar products, for artificial boards, plastics and paper.

Dr. Herty demonstrated that the Southern pines contain, in addition to cellulose and lignins, free fatty acids and glycerides of those acids. The resin acid contents of the sapwood are so low as to be negligible. It is in trees of older growth, about ten years, that high yields of resin acids and turpentine are secured. For this reason, trees under ten years of age are used for pulpwood. There are over 10,000 different kinds of paper manufactured today and over 90 per cent of them are made from wood pulp. The bulk of the paper is mass-produced newsprint. There is much pulp made for kraft, paper board, plastics, and threads for the textile industries and for other purposes. To meet the growing needs of industry for low cost pulps, improvements are constantly made in the technique of the pulp industry. Dr. Herty's researches on the distribution of resin, the fatty acids and their glycerides, showed, as was widely believed in former years, that the rosin contents of Southern trees were not a hindrance to its use for pulping, and the publicizing of his opinions, resulted in "putting Southern pulp on the map" and leading to the building of numerous mills of great daily capacity.

#### Desirable Advantages for Paper Making

The great areas opened in the South for paper making possess every desired advantage. There are numerous fine shipping ports on the Atlantic with vessels sailing to all the continents. There is good river and rail transportation. Labor supplies are good and manufacturing costs are low. Climatic conditions are favorable and distribution facilities are quite as satisfactory as those in the Northern States. In practically all particulars, the Southern industry operates under almost ideal conditions. This explains its rapid and sensational growth within a few years. Paper production by mass methods, utilizing the lowest cost processes, can be pursued in the South on an unlimited scale. Today, kraft and paper board are being produced at low costs and extensively marketed. Newsprint is claiming equal attention. In the opinion of experts the day is not far distant when the Southern States will rank among the world's greatest producers of newsprint paper. This is America's greatest prospect for a rapidly expanding paper industry.

The movement of the industry to the South calls for much capital expenditure. The investment in land, timber reserves, mechanical equipment and carrying charges, is large.

#### Controlling Expansion

In order to prevent concentration of production, the United States Forest Survey has announced that to control the expansion of the pulp industry in the South, the following policies have been adopted:

1. There should be no greater installation of mills than the local supplies can support without trespassing on the operations of other forest-using industries.

2. In so far as economic circumstances will permit, new mills should be distributed throughout the region and not concentrated in one area.

3. Each plant should be a permanent fixture and should utilize the timber in its territory on a sustained yield basis, with full regards for the needs of other wood-using industries.

There are no requirements with regard to reforestation. This should be insisted upon by the Government in the interest of the whole industry. Many large companies, fully recognizing the necessity for preserving pulp reserves for the future, are voluntarily replanting the worked over ground. This question is of far more importance to the national welfare than the three restrictions of the U. S. Forest Survey.

#### Great Storehouses of Fibrous Material

The South and the Pacific North West hold the greatest storehouse of fibrous material known. These extremely valuable resources are situated in perfect settings for profitable operations. They have their own definite markets and they are worthy of effective conservation. This is particularly necessary because it has been demonstrated that the demands for paper and pulp vary with the price. Newsprint, made from rags, in 1860, sold in New York City for twenty-two cents per pound. When the wood pulp industries developed they enabled newsprint to be sold profitably at two to three cents per pound. These great price variations were reflected in tre-

mendous increases in the production of paper. Today, inventors are actively engaged in improving paper making machinery and in improving pulping so as to reduce costs and pave the way for still greater mass production. The opening up of the wood resources of the South has led to the use of cheaper types of wood and species of trees that are not demanded by lumber and other industries. These include hemlock, tamarack, jack pine and other trees.

It is well to remember that any substance rich in cellulose is suitable for making pulp.

#### Laboratory Experiments Made

Experiments were made in the laboratory in pulping southern woods by the soda, sulphate, sulphite and ground wood processes and the data secured attracted wide attention among American paper men. Mill-scale tests were made with excellent results, which left no doubt as to the value of southern woods for kraft and similar papers. All this work confirmed what Dr. Herty and other investigators had found and reported and influenced paper makers to realize that American forest resources suited to the fiber industries had been greatly enlarged in districts perfectly adapted to the establishment of pulp mills.

The Forest Products Laboratory in 1926-1927 worked out improved methods for cooking sulphate pulps from long leaf pines. Strong white pulps were secured by chlorination bleaching. Good newsprint papers were made by mixing pine sulphite pulps with pine ground wood and with black gum ground wood. Newsprint of good quality was made from black gum by semi-chemical methods. The semi-chemical, or mixtures of ground wood and chemical pulps, processes were found to be suited to pulping Southern hardwoods, chestnut and other trees. These pulps made good corrugated boards, butchers wrap and lighter colored paper grades.

The development of Southern paper mills has emphasized the physical and chemical differences of the Northern, North-Western and Southern pulpwoods. Their rates of growth, climatic differences, and fiber patterns, lead to different methods of technology in paper making. When they are thoroughly understood, it seems probable that physical and chemical processes can be discovered that will lead to marked



Courtesy of Rayonier, Inc.

MILL OF RAYONIER INC., FERNANDINA, FLA. WHERE FIRST BLEACHED SULPHITE WAS MADE FROM SOUTHERN PINE.





improvements in the qualities of the papers made from them. While much has been done in the scientific analyses of the Southern woods, a multitude of problems still await solution. Such research costs money and is laborious and time consuming, but it is a fundamental necessity in the production of profit-making industries. This is beginning to be recognized and many paper mills now have well equipped research laboratories.

The inducements held out for the establishment of paper mills in the Southern States included, besides the great resources of pulpwoods near navigable waters, were lower manufacturing costs. The pioneer mills found a saving of about 15 to 20 per cent in the construction of buildings. Wages were about 20 per cent lower than in Northern districts and there was a large saving in fuel and heating expenditures.

#### Great Mills Start in the South

The first tangible result of the impressive publicizing of the paper making resources of the South by Dr. Herty was seen in the formal opening October 1, 1936, of the first unit of the Union Bag and Paper Company's mill at Savannah, Ga. Two additional units were added in successive years giving the mill a capacity at present of thirteen digesters and producing 1,420,000 lbs. of sulphate pulp every twenty-four hours, and three 236 inch Fourdriniers and one 124 inch cylinder producing 1,250,000 lbs. of kraft paper and board.

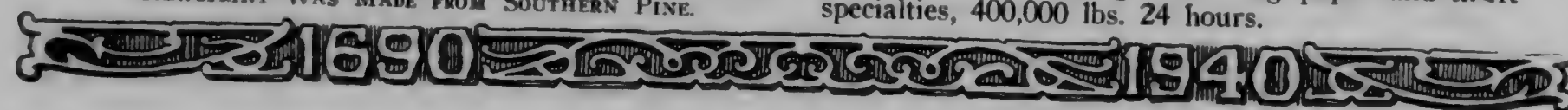
The next outstanding development in the South was the opening of the Champion Paper and Fibre Company at Pasadena, Texas, in 1937. This was a bleached sulphate pulp mill. A paper unit has just been added which is equipped with one 214 inch Fourdrinier making coated paper.

The next mill in the South to claim wide attention was the plant of Rayonier, Inc., Fernandina, Fla., which started a pulp mill to make bleached sulphite from Southern pine which was an altogether new undertaking.

Following this the next unusual undertaking in the South was the opening of the Southland Paper Mills, Inc., at Lufkin, Texas, to make newsprint from Southern pine. This plant has its own ground wood



SOUTHLAND PAPER MILLS, INC., LUFKIN, TEX., WHERE FIRST NEWSPRINT WAS MADE FROM SOUTHERN PINE.



mill, but purchases its bleached sulphate which it uses in place of sulphite from the Champion Paper and Fibre Company at Pasadena, Texas.

The list of the additional mills which have been opened in the South since the Union Bag and Paper Company opened its first unit at Savannah, shows the great importance of the Southern development in the short space of four years.

Hollingsworth & Whitney Company, Mobile, Ala., bleached sulphate fiber, 200,000 lbs.; unbleached sulphate fiber, 400,000 lbs. 24 hours. One 184 inch Fourdrinier and one 124 inch cylinder. Unbleached, semi-bleached and fully bleached kraft wrapping and specialties, 320,000 lbs. 24 hours.

Crossett Paper Mills, Crossett, Ark., bleached sulphate fiber, 180,000 lbs. 24 hours; unbleached sulphate fiber, 440,000 lbs. 24 hours. One 210 inch Fourdrinier and one 90 inch cylinder. Kraft bag, wrapping and butchers; bleached kraft bag, wrapping and butchers; bleached kraft, semi-bleached and natural board and butter carton and folding box boards. Fourdrinier mill, 400,000 lbs. 24 hours. Cylinder mill, 100,000 lbs. 24 hours.

Container Corporation of America, Fernandina, Fla., sulphate fiber, 300,000 lbs. 24 hours.

National Container Corporation, Jacksonville, Fla., sulphate fiber, 500,000 lbs. 24 hours. One 226 inch Fourdrinier. Kraft board, 400,000 lbs. 24 hours.

St. Joe Paper Company, Port St. Joe, Fla., sulphate fiber, 700,000 lbs. 24 hours. One 213 inch Fourdrinier. Fourdrinier kraft liner and .009 corrugating board, 700,000 lbs. 24 hours.

Brunswick Pulp and Paper Company, Brunswick, Ga., bleached sulphate fiber, 400,000 lbs. 24 hours.

Southern Kraft Corporation, Springhill, La., unbleached sulphate fiber, 1,450,000 lbs. 24 hours; bleached sulphate fiber, 330,000 lbs. 24 hours. One 204 inch and two 213 inch Fourdriniers. Fourdrinier board; bleached tag, manila, file folder, tablet, cup stock, milk bottle stock and envelopes. Bleached paper and board 300,000 lbs. 24 hours. Kraft board 1,400,000 lbs. 24 hours.

Ecusta Paper Corporation, Pisgah Forest, N. C. Four Fourdriniers. Cigarette paper.

North Carolina Pulp Company, Plymouth, N. C., bleached and unbleached sulphate fiber, 900,000 lbs. 24 hours. One 150 inch cylinder. Bleached, semi-bleached and unbleached board and paper specialties, 300,000 lbs. 24 hours.

West Virginia Pulp and Paper Company, Charleston, S. C., sulphate kraft fiber, 800,000 lbs. 24 hours. One 242 inch Fourdrinier. Container board, 800,000 lbs. 24 hours.

Southern Kraft Corporation, Georgetown, S. C., sulphate fiber, 1,400,000 lbs. 24 hours. Two 212 inch Fourdriniers. Fourdrinier liner board and Fourdrinier corrugating board, 1,300,000 lbs. 24 hours.

Chesapeake-Camp Corporation, Franklin, Va., sulphate fiber, 330,000 lbs. 24 hours. One 210 inch Fourdrinier. Kraft Fourdrinier liner, kraft corrugating, kraft wrapping, kraft bag paper and kraft specialties, 400,000 lbs. 24 hours.



Johns-Manville Corporation, Jarratt, Va., ground wood. Plain and decorative insulating board products, 300,000 sq. ft. 24 hours.

Florida Pulp and Paper Company, Canton, Fla., sulphate fiber, 160,000 lbs. 24 hours. One 158 inch Fourdrinier. Bleached sulphate specialties, 150,000 lbs. 24 hours. (Under Construction.)

St. Marys Kraft Corporation, St. Marys, Ga., sulphate fiber. (Under Construction.)

Flintkote Company, Meridian, Miss., wood fiber insulation board, 200,000 lbs. 24 hours. (Under Construction.)

Tennessee Valley Paper Mills, Inc., Savannah,

Tenn., newsprint. (Under Construction.)

These were the pioneer companies. They were all large and the probability is that future plants will be large. This is due to local conditions. The mills generally own their own forests and are self-contained. This calls for a large investment in the first instance and then for a large working capital.

The first mills manufactured kraft papers and boards. Rayon and newsprint mills followed. The future holds out prospects of the newsprint industries moving southward and the center of the rayon and textile fiber manufactures centering there. It is certain that wood fibers and textiles made from them in the future will become great Southern industries.

#### CHAPTER XI

### Scientific and Educational Cooperation

THE development of chemical and engineering aids have kept pace with other developments in paper manufacture. Water power was the first source used in American paper mills. Later on water and steam power plants were employed. That was the main reason for establishing paper mills on the banks of rivers and streams. The latest development was in electrical power. This followed the widespread utilization of electrical power in other industries. Electric power proved itself superior to all other prime forces for use in paper mills on account of the multiple operations it can be applied to. Like all other branches of engineering, electrical power development has undergone a marked evolution. Before the World War, the electrical power in paper plants was used in single motor drives directly connected by line shafts or transmitted through belt-driven pulleys. Variations in speed were secured by a combine of voltage and field control on the motor. The power came from a generator operating a belt driving a constant speed shaft. Cones, belts and clutches were used as they had previously been used in steam plants. When, during the first World War, larger paper machines called for greater speeds to meet increased demands for paper output, sectionalized drives were designed. The Crown-Willamette Paper Company, West Linn, Ore., installed a high-speed newsprint

machine suitable for high or low speed operations. This was a nine-section outfit. This sectional drive supplied the power for a 164 inch Fourdrinier running at a speed of 1,000 feet per minute. It was a revolutionary plant and a successful one. Its success led to the wide adoption, in 1921 and later years, of sectionalized motor drives in many mills.

Electric motors are now used for driving most of the auxiliary mill machinery. Synchronous motors drive the wood-chippers, grinders, beaters, Jordans, pumps, conveyors and other equipment.

Many valuable electrically driven pieces of equipment have led to great economies in mills. In recent years photo-electric scanning heads have been adopted to detect spots and other defects in paper sheets passing the rolls. Great as the application of electrical machines and power are in paper plants, improvements are constantly being made and finality has not been reached.

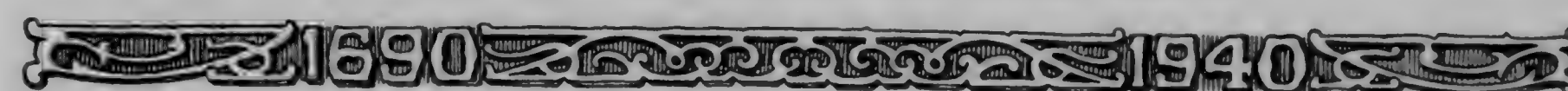
#### The Recovery of Alkalies

In the recovery of alkalies from the spent liquor in sulphate and other processes, refinements in technique are being introduced with the view of increasing the amount of substance reclaimed and its quality so that general treatment costs might be reduced.



Courtesy Great Northern Paper Co.

MATTACOOK POWER HOUSE AND DAM OF GREAT NORTHERN PAPER CO.





M. B. Mount, an expert in this work, reports that lime recovery, along with continuous causticizing and the washing of precipitated calcium carbonate sludges, came to the paper industry some thirty years ago as a result of pioneer work done by the manufacturers of alkaline products using the ammonia-soda process. Paper manufacturers have adapted the ideas to their own peculiar needs and requirements and the process of evolution is still at work. No part of it has been the subject of greater discussion and more divergence of opinion than that of lime recovery. In recent months this issue has been summarized as follows:

1. What should be the proper moisture content of precipitated calcium carbonate resulting from a causticizing operation when that sludge is fed into a recovery kiln?
2. Is it more economical to feed a sludge running 50-60 per cent moisture rather than one averaging 35-40 per cent moisture, measured on a dry basis?
3. Which method tends to produce the better grade of recovered lime?
4. Which method tends to simplify operation?
5. Is or is not the cost of the additional fuel required to evaporate the extra water offset by (a) obtaining a better product; (b) simplification of operation; (c) easing the work of the operators; or (d) the minimization of "ringing" in the kilns or dust losses through the stack?

To give point to these questions the observations of several qualified authorities are appended:

In answer to a question as to why water is not either eliminated from the calcium carbonate sludge charged into the kiln or added to the kiln feed, a mill executive stated: "It seems to be contrary to all accepted theory but my superintendent tells me that he gets better results by adding water after filtration; why, I don't know."

Another executive of long experience said, in effect: "You know as well as I do that a certain number of B.T.U.'s are required to evaporate a pound of water; why spend money for the drying and washing of the carbonate sludge and then spend more money for the evaporation of the added water? It doesn't sound reasonable to me."

The increasing application of science, chemistry



Courtesy Institute of Paper Chemistry

INSTITUTE OF PAPER CHEMISTRY

and engineering to the paper making industries has called for the employment of many trained technicians. The practical man of the pioneer days has retired before the well-trained technical graduate from the universities, and engineering schools.

#### The Institute of Paper Chemistry

To supply chemical specialists to the American paper industry, the Institute of Paper Chemistry was organized by a group of Wisconsin pulp and paper mill men and the officials of Lawrence College, Appleton, Wis., in 1929. Its first class was formed in February, 1930. The purpose of this college was threefold:

1. The training of technical men, graduates of recognized colleges and universities, through a period of graduate study, to assume responsible positions in the industry.
2. The organization of a research library for the use of the Institute and the industry as a whole.
3. The establishment of a research center, where the latest scientific equipment and knowledge could be accumulated and made available to the industry and where researches could be carried on in both fundamental and applied problems.

The Institute is affiliated with Lawrence College, an institution chartered in 1847, which has a long tradition of sound scholastic standards and which, in recent years, has made an extraordinary advance in the educational world. This affiliation has given to the Institute the benefit of the administrative guidance of the College and of its established academic procedures and has made available, when desired, certain members of its staff of instruction.

Through this affiliation, also, it is possible for the students of The Institute of Paper Chemistry to receive the degrees of Master of Science and Doctor of Philosophy upon completion of the respective course of study, these degrees being granted by Lawrence College. The College is a member of the North Central Association of Colleges and Secondary Schools as a degree-granting institution and is on the original list of the Association of American Universities.

#### Director of the Institute

The President of Lawrence College, by virtue of his office, is the Director of the Institute. However, the active direction of the Institute is vested in the officers of a Board of Trustees, which is composed of leading executives in the pulp and paper industry. These Trustees represent the member mills as the holders of the property of the Institute and are the group who choose the officers and the staff of the Institute and who determine its general policies. The educational program of the Institute is determined by the Dean, with the cooperation of the other members of the staff of instruction.

In addition to the advantages accruing from the affiliation with Lawrence College, the location of the Institute at Appleton is strategic in that, within a seven mile radius of the city, there is nearly every type of pulp and paper manufacture, as well as many

of the more prominent lines of paper conversion. It is almost unique in the United States in this respect. It would be impossible to find any similar compact area with such a wide diversity of paper manufacture. In addition, much paper mill machinery and equipment is made in immediate proximity to Appleton, and the manufacturers of this type of material, both from this region and elsewhere, have been very liberal in supplying the Institute with equipment. Access to the illustrative material available in these manufacturing plants is thus assured to the students of the Institute.

There is a third benefit which results from the location. The Institute draws upon the experts now employed by the several manufacturing companies in this area. It is one of the fundamental features of the plans for The Institute of Paper Chemistry to have as members of its staff the highly trained men who have the practical experience which has come from years of service in manufacturing enterprises. These come into the Institute as special lecturers in their individual fields.

#### Other Paper Making Schools

Other paper making schools which are doing splendid work are, the University of Maine, Department of Chemical Engineering, Pulp and Paper Division in charge of Professor Paul Bray; and the New York State College of Forestry, Professor C. E. Libby in charge of pulp and paper manufacture. Paper making courses also are conducted at the present time at the University of Michigan, Ann Arbor, Mich.; the University of Washington, Seattle, Wash., and the Iowa State College, Ames, Iowa. Other opportunities for instruction in the manufacture of pulp and paper are afforded by the Institute of Industrial Arts School of Pulp and Paper Making at Gardenvale, Quebec; the Massachusetts Division of University Extension of the State of Massachusetts, James A. Moyer, Director, 200 Newbury street, Boston, Mass.; and the International Correspondence Schools, Scranton, Pa. Mill courses in the manufacture of pulp and paper are offered by the management of a large number of the larger mills of which good examples are the courses of the Champion Paper and Fibre Company at its Canton, N. C. mill and the Crown-Zellerbach Corporation at its Camas, Wash. mill. In this connection opportunity for self-instruction

tion is offered by the five volumes of the "Manufacture of Pulp and Paper" prepared under the direction of the Joint Executive Committee on Vocational Education Representing the Pulp and Paper Industry of the United States and Canada. The first volume of this series was printed in 1921 and several volumes of the series have been reprinted several times showing the great value of the work.

#### Forest Products Laboratory

The Forest Products Laboratory, United States Department of Agriculture, Forest Service, Madison, Wis., for quite a number of years has been doing research work of a high character which has conferred many benefits upon the industry. Carlisle P. Winslow is director and Dr. C. E. Curran is chief of the pulp and paper section. Important investigational work also has been conducted for some time by the National Bureau of Standards, Department of Commerce, of which L. J. Briggs is director and B. W. Scribner, chief of paper section.

#### Tariff Plays Important Roll

The tariff has played an important role in the development of the American paper industry. The first act, July 4, 1789, placed a duty of 7½ per cent on writing, news, wrapping, wall papers and pasteboard. The tariff of August 10, 1790, increased the duty to 10 per cent. The act of April 27, 1816, increased the duty on paper of every description to 30 per cent ad valorem. On May 22, 1824, the duty was increased on many papers to 10 cents per pound. The act of August 30, 1842, placed higher duties on several classes of paper. Writing paper was taxed 15 cents per pound.

A reduction of ten per cent was made in some classifications in the act of June 6, 1872. The act of March 3, 1883, kept the duty on newsprint at 10 per cent and 10 per cent on dried pulp. The act of October 1, 1890, placed a duty on ground wood of \$2.50 per ton and \$6 per ton on unbleached chemical wood pulp. The act of August 27, 1894, placed a duty of ten per cent on bleached and unbleached pulp. The act of July 24, 1897, made many changes. For the first time, newsprint was specifically mentioned. In previous tariffs it was taxed the same as book paper. The act of August 5, 1909, revised the duties on all imported papers. Newsprint valued at not over two cents per pound was taxed three-



Courtesy Great Northern Paper Co.

MADISON MILL OF GREAT NORTHERN PAPER CO.





EAST MILLINOCKET MILL OF GREAT NORTHERN PAPER CO. *Courtesy Great Northern Paper Co.*

sixteenths of one cent per pound. Writing paper was taxed three cents per pound and 15 per cent ad valorem.

#### Newsprint Goes on Free List

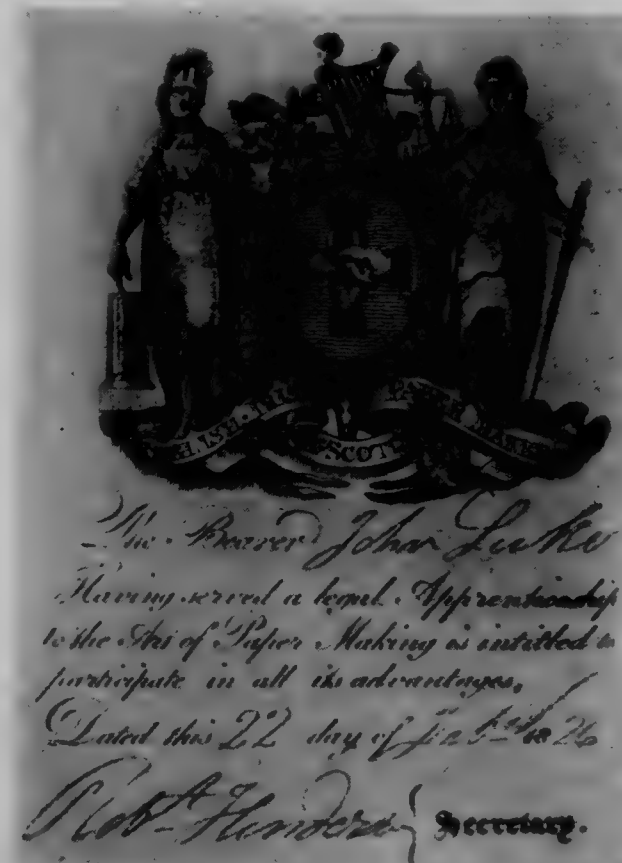
The act of July 26, 1911, known as the Canadian Reciprocity Act, admitted pulp, newsprint and other papers, free. The October 3, 1913 act, admitted pulp and newsprint, valued not over 2½ cents, free, and made reductions on certain classes of paper with countries having reciprocal tariffs. This was the Underwood-Simmons Act.

When the tariffs were increased, as they generally were, paper prices increased and this attracted new capital investments and many new mills were built. Often this increased competition which adversely affected prices. Consequently, frequently changed tariffs resulted in corresponding changes in the production of paper. The Canadian Reciprocity tariff of July 26, 1911, made the greatest change in the

industry. By admitting pulp and newsprint free, the Canadian industry was stimulated at our expense and Canada has been able to hold a large share of the business since.

#### Industry Has Bright Outlook

Surveying the industry on the 250th anniversary of its establishment, we have noticed changes of extreme interest. The early mills, making news, book, writing and boards in limited quantities, employed only two or three hands and less than \$5,000 capital. In contrast we have magnificent mills costing many millions of dollars to construct and employing thousands of men. The day of the small mill is passing and the future will favor great mills with immense outputs. Great as the industry's success was in the past, its promises are brighter than ever. Its rapid evolution will continue to follow new and improved machinery, processes and products, while continually expanding markets will be served.



CERTIFICATE OF PAPER MAKING GIVEN JOHN LUKE IN 1826 BY THE ENGLISH, IRISH AND SCOTCH PAPER MAKERS.



## Equipment and Material Bought and Used By Pulp and Paper Mills

By W. G. MacNaughton, Engineer, News Print Service Bureau

ORIGINALLY, papermaking was a conversion process with rags, waste paper and later wood pulp and other substances as the basic raw materials. Many such mills exist at present located chiefly in populous centers and producing writing paper from rags and bleached wood pulp, book paper from deinked book papers and bleached wood pulp, and paperboard from mixed waste papers. Some of these have extended their operations to include subsequent processes such as coating, glazing and decorating the paper and, in the case of paperboard, the production of boxes and shipping containers which otherwise are carried out in separate fabricating plants.

#### Start Out As Conversion Mills

Many plants starting out as conversion papermills using wood pulp have later acquired pulp mills with supporting timber lands to supply their needs. Until about the turn of the century many plants made pulp only, groundwood, sulphite and sulphate pulps which was supplied to conversion mills.

Many of the conversion paper mills have attained large size and except for the wood pulp needed are self-contained in that they have their own power plants, repair shops and housing for their employees.

#### More Complete Integration of the Industry

It is, however, with the development of news print during the past half century and more recently of kraft wrapping paper and container board that more complete integration of the industry can be seen. In these plants the operations cover the range from the control of hundreds, and frequently, thousands of square miles of timber land, the production of pulpwood and its transportation, the manufacture of the pulps and the paper or board as well as townsite developments, and in the case of kraft the fabrication of the paper into bags or the paperboard into boxes and shipping containers.

#### Placed in Undeveloped Sections

Such integrated pulp and paper mills are usually placed in previously undeveloped sections and of necessity must be largely self-sufficient covering a wide range of activities and using equipment and supplies of all kinds.

Besides the plants and their equipment, there is necessary all the facilities for exploring, surveying and developing the timber lands, the production of the pulpwood and the means of transportation and storage of the wood and of the product.

#### Town Must Be Developed

In such a situation a town for the employees has to be developed with all the modern facilities of streets, water, sewage and lighting, housing, education, health and recreation as well as police and fire protection.

At the plant a repair and machine shop of greater than usual scope has to be maintained with a full complement of machine tools.

#### Large Users of Power and Steam

Since pulp and paper mills are very large users of power and steam, their hydroelectric and steam plants are among the largest of such industrial power plants and use all of the most modern appliances and control instruments.

In the pulp mills, depending on the process, many types of special equipment common to other industries are used. Such are large pressure vessels as boilers and digesters, screens, crushers and refiners, condensers and heat exchangers, as well as rotary kilns and vacuum evaporators.

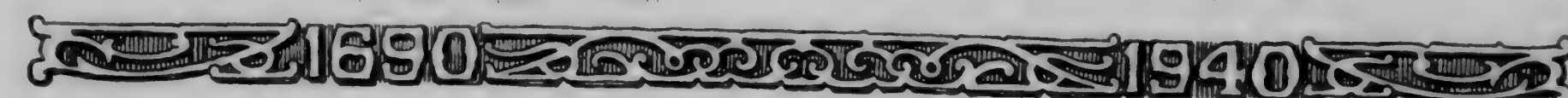
#### Large Users of Important Materials

As many of the processes are productive of metal corrosion, pulp and paper mills are among the large users of aluminum, copper, bronze and the various stainless steels. They are also important users of all kinds of indicating, recording and controlling instruments.

It may be truly said that the pulp and paper industry, at the present time covers the entire range of operations from timber to finished product ready for use, including the needs of a populous community.

The outstanding feature of a fully integrated paper mill such as seen in many parts of this continent is the diversity and extent of the kinds of equipment, materials and supplies, and the facilities for repair and replacement of the vital elements.

The equipment and materials purchased and used by the paper and pulp mills is classified according to departments on the following pages.







- |                                 |   |                                   |   |
|---------------------------------|---|-----------------------------------|---|
| I.—Pulpwood .....               | <ul style="list-style-type: none"><li>1. Exploration</li><li>2. Production</li><li>3. Transportation</li><li>4. Preparation and Storage</li></ul>   | VI.—Power Plants .....            | <ul style="list-style-type: none"><li>1. Hydro-electric plant</li><li>2. Steam power plant</li><li>3. Supplies</li></ul>  |
| II.—Wood Pulp .....             | <ul style="list-style-type: none"><li>1. Mechanical</li><li>2. Soda</li><li>3. Sulphate</li><li>4. Sulphite</li><li>5. Bleaching</li><li>6. General equipment and supplies</li></ul>  | VII.—Engineering Department ..... | <ul style="list-style-type: none"><li>1. Drafting</li><li>2. Surveying</li><li>3. Construction</li><li>4. Pattern shop</li><li>5. Foundry</li><li>6. Blacksmith shop</li><li>7. Machine shop</li><li>8. Carpenter shop</li><li>9. Electrical repair</li><li>10. General maintenance</li></ul> |
| III.—Rags and Waste Paper ..... | <ul style="list-style-type: none"><li>1. Rags</li><li>2. Waste paper</li></ul>  | VIII.—Laboratory Equipment .....  | <ul style="list-style-type: none"><li>1. Chemical Analysis</li><li>2. Pulp testing</li><li>3. Paper testing</li><li>4. Coal testing</li><li>5. Oil testing</li><li>6. Cement testing</li><li>7. Belt testing</li><li>8. Meteorological records</li><li>9. General</li></ul>                   |
| IV.—Paper Manufacture           | <ul style="list-style-type: none"><li>1. Stock preparation</li><li>2. Papermaking</li><li>3. Paper finishing</li></ul>  | IX.—Administration and General    |   |
| V.—Paper Conversion ..          | <ul style="list-style-type: none"><li>1. Coating</li><li>2. Waxing</li><li>3. Oiling</li><li>4. Saturating</li><li>5. Creping</li><li>6. Pasting</li><li>7. Ruling</li><li>8. Printing</li><li>9. Bag Making</li><li>10. Box Making</li><li>11. Tube Making</li><li>12. Envelope Making</li><li>13. Cup Making</li><li>14. Cap Making</li><li>15. Tablet Making</li><li>16. General</li></ul> | X.—Town .....                     | <ul style="list-style-type: none"><li>1. Housing</li><li>2. School</li><li>3. Church</li><li>4. Hospital</li><li>5. Water and sewage</li><li>6. Public safety</li><li>7. Merchandising</li><li>8. Hotel and boarding house</li><li>9. Laundry</li><li>10. Farm</li></ul>                      |

### PURCHASES FOR THESE DEPARTMENTS

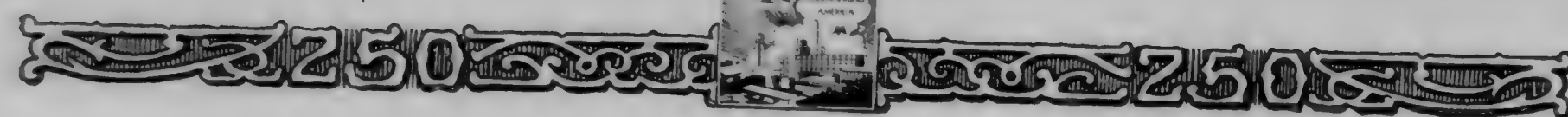
- |   |  |
|---|--|
| I.—Pulpwood   |  |
| 1. EXPLORATION  | Electric Lighting Equipment  |
| Canoes, Boats and Camping supplies  | Horses and Logging harness—Hay, oats, etc.   |
| Airplanes; Flying Boats   | Horse trucks and logging sleds   |
| Aerial photography equipment  | Portable power saws; Portable barking machines; Cross cut saws; Wedges; Cant hooks; Peavies; Pike poles; Pickaroons; Chain; Axes; Bark Spuds; Tool handles |
| Radio equipment   | Donkey engines; Blocks and Cable   |
| 2. PRODUCTION   | Power skidders and equipment   |
| Camp equipment and supplies; Cots and bedding; Heaters; Cooking ranges; Canned goods; Dried and preserved fruit; Condensed milk, etc. | 3. TRANSPORTATION  |
|   | Side rod and Geared locomotives; Logging cars and Railroad equipment   |
|   | Safety car stake equipment   |



- |   |   |
|---|---|
| Power trucks, Gasoline and Diesel tractors; Snow plows; Water tanks   | Continuous filters for washing lime sludge and brown pulp     |
| Road machinery; Culverts  | Lime recovery apparatus                                       |
| Gasoline and Diesel Power boats; Alligators; Tugs; Barges; Booms; Boom chains; Aerial tramways; Horse and Power loaders; Locomotive cranes; Wood grapples | Chemical recovery systems                                     |
| Cableways; Flumes   | Waste heat boilers  |
| 4. PREPARATION AND STORAGE  | Supplies  |
| Saw carriages; Band saws; Slasher saws; Jump saws   | Soda ash; Chemical lime; Fire brick; Packing                  |
| Steam and power kickers and niggers; Jack ladders   | 3. SULPHATE   |
| Knife barkers and Barking attachments   | Sulphate pulp digesters, welded steel and control instruments |
| Slab barkers  | External heating equipment                                    |
| Drum barkers; wood washers  | Digester insulation; Pipe insulation                          |
| Log barkers   | Diffusers; Washing tanks; Washing apparatus                   |
| Pulpwood storage conveyors; Pulpwood stackers   | Multiple effect vacuum evaporators                            |
| Wood splitters operated by power and steam  | Disk evaporators  |
| Slab chippers   | Rotary furnaces   |
| Knot borers   | Smelting furnaces; Air compressors                            |
| Wood "peckers"  | Electrical precipitation equipment; Flue gas scrubbers        |
| Chippers; Rechipers; Crushers; Hogs   | Dissolving tanks  |
| Chip driers; Chip screens   | Causticizing tanks  |
| Bark presses; Conveyor scales   | Vacuum filters for washing sludge and pulp                    |
| Supplies  | Continuous causticizing and lime recovery equipment           |
| Saws; Barker and Chipper knives   | Rosin and turpentine recovery equipment                       |
| Cant hooks; Axes; Hookaroons  | Supplies  |
| II.—Wood Pulp (General equipment in 6)  | Smelter furnace linings; Soapstone blocks                     |
| 1. MECHANICAL PULP  | Salt cake; Chemical lime, Sulphur, Packing                    |
| Pocket, Magazine and Caterpillar grinders   | 4. SULPHITE PULP  |
| Dressing lathes and burrs   | Sulphite digesters and control instruments                    |
| Grinder speed governors   | Digester linings, Indirect heating equipment                  |
| Pressure regulating valves  | Digester insulation; Pipe insulation                          |
| Temperature regulators  | Blowoff valves; Relief valves, Steam separators               |
| Pressure pumps; Accumulators  | Digester relief coolers; Blowoff pipe                         |
| Bull screens; sliver screens  | Acid pumps and valves   |
| Hydraulic presses   | Stainless steel, bronze, monel metal and lead valves          |
| Wire mat weaving machines   | Lead and bronze check valves                                  |
| Supplies  | Blowpits; Drainer tile and matting                            |
| Pulpstones; Flanges; Shafts; Couplings  | Waste sulphite liquor concentrating and drying equipment      |
| Flange removers; Flange bushings; Grinder piston packing  | Lead burning equipment  |
| 2. SODA PULP  | Sulphur burners and control instruments; Recording Pyrometers |
| Soda pulp digesters; Pressure and Temperature Recorders   | Burner gas coolers; Refrigerating machines                    |
| External heating equipment  | Gas Washers   |
| Digester insulation; Pipe insulation  | Milk of lime  |
| Blow tanks; Washing pans; Vacuum washing equipment  | Lime slackers   |
| Black liquor filters  | Milk of lime absorption systems                               |
| Multiple effect vacuum evaporators  | Gas exhausters  |
| Rotary furnaces   | Limestone   |
| Dissolving tanks; Filter presses  | Absorption towers and control equipment                       |
| Charcoal recovery apparatus   | Lead and bronze gas fans                                      |
| Causticizing tanks and apparatus  |   |







Limestone quarrying equipment; Lime burning equipment  
Acid storage tanks; Liquid level recorders  
Recovery tanks and towers; Gas masks  
Chemical stoneware; Tower packing

#### Supplies

Digester lining brick; Quartz; Litharge, Glycerine; Silicate of soda  
Sheet lead; stainless steel; Lead, bronze and copper pipe  
Bronze and hard lead strainers  
Bronze and Monel metal shafting for acid pumps  
Sulphur; Lime; Limestone

#### 5. BLEACHING

Electrolytic chlorine cell equipment  
Caustic soda recovery equipment  
Liquid chlorine absorption systems  
Settling tanks  
Pulp bleachers; Tanks and Agitators  
Bleached pulp washing equipment

#### Supplies

Pulp; Salt; Liquid Chlorine; Lime; Caustic Soda

#### 6. GENERAL WOOD PULP EQUIPMENT

Knotters; Diaphragm and centrifugal screens  
Screenings refiners; Kollergangs  
Rifflers  
Thickeners; Deckers; Wet machines; Automatic skimmers; Savealls; Sedimentation tanks  
Pulp drying machines  
Tanks, Agitators  
Fans; Ventilating equipment  
Centrifugal and Plunger stock pumps; Stock meters  
Stock consistency regulators  
Baling presses

#### Supplies

Screen plates; Screen diaphragms  
Cylinder molds and Backing wire; Cylinder packing  
Bronze and nickel alloy facing wire

#### III.—Rags and Waste Paper

##### 1. RAGS PREPARATION

Sorting tables; Conveyors; Ventilating equipment  
Rag cutters; Dusters, Dust Collectors  
Cylinder and Globe rotary boiler  
Bleaching and washing engines  
Drainers; Drainer tile

#### Supplies

Rags; Old rope; Baggings; Cotton linters; Manila; Hemp, etc.

Lime; Soda and ash; Bleach; Antichlor

##### 2. OLD PAPER CONVERSION

Sorting tables; Conveyors; Ventilating equipment  
Paper Shredders; Dusters, Dust Collectors  
Vomiting boilers; Kiers; Cylinder and Globe rotary boilers; Tanks and Pumps  
Special deinking and defibering equipment  
Paper stock washing equipment  
Continuous beaters and Beating attachments  
Paper pulpers  
Cooking and pulping engines  
Magnetic separators

#### Supplies

Paper stock of all kinds  
Soda ash; Caustic Soda; Sodium Silicate; Kerosene; Bentonite; Chlorine

#### IV.—Paper Manufacture

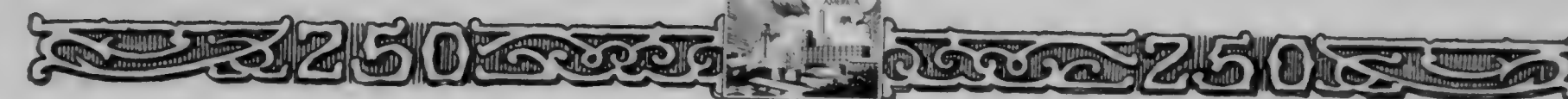
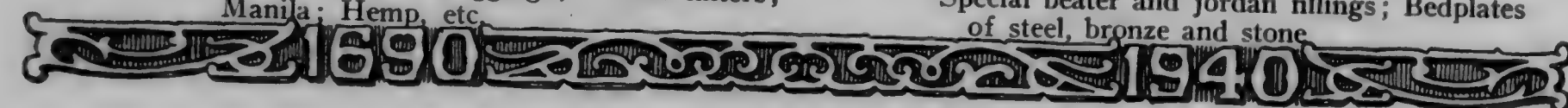
##### 1. STOCK PREPARATION

#### Equipment

Hand and electric trucks; Portable elevators; Monorail systems  
Conveying and elevating equipment  
Pulp shredders; Paper pulpers  
Hollander and special beating engines; Lava stone beater rolls and bedplates; Beater attachments; Washing cylinders  
Mixing tanks; Mixing and proportioning apparatus  
Kollergangs; Refiners; Jordans; Tanks; Agitators; Agitator drives  
Stock consistency regulators; Plunger and Centrifugal stock pumps  
Water screens and filtering systems; Water pumps  
Clay mixing apparatus; Stock chests; Gate valves  
Size cookers; Emulsifying apparatus  
Color testing and matching equipment; Daylight lamps  
Savealls and sedimentation systems

#### Supplies

Wood pulp of all kinds; Rag pulp; Rope pulp; Cotton linters  
Old paper; Shavings, etc.  
Clay; Talc; Crown filler; Pearl hardening; Barytes; Blanc fixe, Satin white, Titanium oxide, etc.  
Rosin; Soda ash; Size; Silicate of Soda; Glue; Starch  
Sulphate of alumina  
Aniline dyes and pigments  
Beater and jordan bars of steel, manganese steel and bronze  
Special beater and jordan fillings; Bedplates of steel, bronze and stone



Beater paddles  
Stainless steel, copper, iron, steel, asbestos cement and wood pipe  
Wood pipe fittings; Corporation cocks

##### 2. PAPERMAKING

#### Equipment

Fourdrinier paper machines; Straight; Harper; Yankee  
Cylinder paper machines; Single; Multi-cylinder  
Single cylinder Yankee machines; Wet press machines  
Combination and special paper machines  
Non-condensing steam engines  
Variable speed transmission equipment  
Variable speed non-condensing steam engines  
Non-condensing and bleeder steam turbines  
Direct current electrical generators  
Sectional motor drive systems  
Direct current motor drive  
Special drives: Marshall; Ferguson, Crandell  
English system rope drive  
American system rope drive  
Paper machine attachments: Edwards; Tompkins-Hawley-Fuller  
Sheahan paper carriers  
Pope air system  
Minton's vacuum driers  
Slices and high stock inlet  
Wire changing apparatus  
Deckle frame supports  
Wire guides; Felt guides; Drier felt guides; Recording tachometers; Special guard boards and doctors  
Broke conveyor attachments  
Felt washers and conditioners  
Jacket stretchers  
Oscillating suction boxes  
Dandy rolls; special paper-marking equipment  
Suction couch rolls; Suction presses  
Special shower pipes; Press roll and Calender doctors  
Steam circulation systems; Drier drainage control systems  
Vapor absorption system; Waste heat economizers  
Dryloft equipment  
Airdrying equipment  
Hoods; Fans; Airheating equipment  
Paper machine screens, diaphragm, oscillating and revolving  
Special pulp cleaning apparatus  
Chain blocks; Air and electric hoists; Traveling cranes; Reels; Winders and slitters  
Collapsible windershafts; Electric irons  
Oil and grease lubrication systems; Oil filters; Air compressors  
Condensation pumps; Positive pressure blowers

Suction pumps; Fan pumps; Savealls; Sedimentation systems

#### Supplies

Fourdrinier wires; Cylinder facing wires  
Woolen felts; Jackets; Drier felts of wool, canvas and asbestos; Deckle straps  
Rubber covered rolls; Wood and granite press rolls  
Calender rolls; Felt rolls; Table rolls  
Suction box covers; Doctor blades  
Wood cogs  
Air, water and steam hose  
Screen plates, Slitter knives  
Belting and packing; Apron cloth; Splicing tissue  
Oil; Grease, Waste, Sulphuric acid; Felt cleaning compounds; Foam and Pitch Killers  
Wire brushes, Brooms, etc.

##### 3. PAPER FINISHING

Rotary paper cutters; Layboys; Counters; Electric static neutralizers  
Sheet trimmers  
Rewinders  
Paper tubes; Cores  
Roll and package wrapping machines  
Paper folding machines  
Supercalenders; Embossing calenders  
Platers; Friction calenders  
Travelling cranes  
Scales  
Baling presses  
Stencil cutting machines

#### Supplies

Glue; Dextrine; Silicate of Soda  
Adhesives  
Mill wrappers; Jute twine and tube rope  
Sealing wrappers; Labels  
Fiber shipping cases  
Wood shipping cases and frames

#### V.—Paper Conversion

##### 1. Paper coating machinery

Rubber blankets, brushes, coating clay, satin white, casein, glue, starch, borax, ammonia

##### 2. Paper waxing machines

Paraffin waxes

##### 3. Oiling machines

##### 4. Saturating machinery

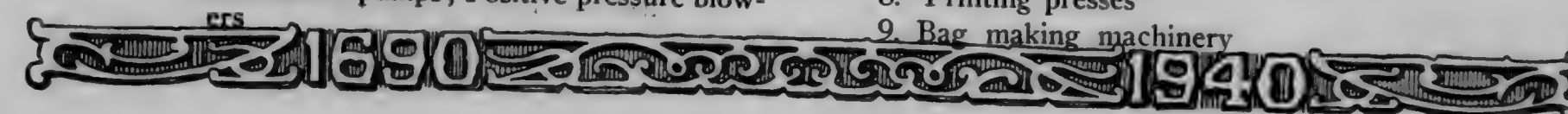
##### 5. Creping machines

##### 6. Pasting machines

##### 7. Ruling machines

##### 8. Printing presses

##### 9. Bag making machinery







10. Box making machinery  
Scorers; Corrugators; Pastors, Glue dissolvers; Gluing machines; Box covering machines
11. Paper tube and core making machinery
12. Envelope making machines
13. Paper cup making machinery
14. Bottle cap making machinery
15. Tablet making machinery
16. General equipment  
Wallboard driers  
Air conditioning equipment  
Air drying equipment  
Coating mixers  
Gumming machines  
Twisting machines  
Paper textile machines

#### VI—Power Plants

##### 1. HYDROELECTRIC PLANT

###### *Machinery and equipment*

Penstocks; Gates, Racks  
Waterwheels and turbines  
Waterwheel governors  
Electric generators and exciters; Motors  
Switchboards and control equipment  
Transformers; Lightning arrestors  
Indicating, Integrating and Recording electrical instruments  
Oil pressure recording instruments  
Electric cranes and Hoists  
Water Level recorders  
Oil tanks and filters  
Wood and steel poles and fittings; Power transmission wire; Messenger wire  
High tension insulators

##### 2. STEAM POWER PLANT

###### *Machinery and equipment*

Steel, brick and concrete chimneys  
Boilers of all designs; Superheaters; Economizers  
Electric steam generators  
Steam accumulators  
Furnaces and automatic stokers; Hand stokers  
Special furnace arches  
Fans for forced and induced draft  
Cinder eliminators  
Air preheaters  
Soot-blowing equipment; Tube cleaners  
Draft control equipment  
Feed water control equipment  
Automatic relief valves; Whistles  
Reducing valves; Blowoff valves  
Coal bunkers; Coal elevators and conveyors  
Coal storage equipment

Coal scales; Coal crushers  
Coal pulverizing and burning equipment  
Ash conveyors; Gratings; Ladders  
Oil burning equipment  
Fuel oil tanks  
Tanks for lubricating oil  
Water softeners; Feedwater heaters; Hot wells  
Water meters; Steam flowmeters  
Indicating and recording thermometers; Draft gages and steam gages  
Boiler meters; Recording gas analyzers  
Boilerfeed pumps; Steam traps and separators  
Steam fire pumps  
Boiler and steam pipe insulation  
Steam turbines; Steam engines; Diesel engines; Gas engines; Electric generators and motors  
Air washers  
Engine stop and signals; Engine governors  
Condensers; Air compressors  
Switchboards  
Circuit breakers and control switches

##### 3. SUPPLIES

Fire brick and fire clay; Special furnace shapes  
Boiler tubes; Superheater and economizer tubes  
Grate bars; Conveyor chain and buckets  
Boiler compound  
Fire hose; Steam, water and air hose  
Steam and water packing and pump valves  
Gage glasses; Gage glass protectors  
Steam pipe, fittings and valves  
Expansion joints  
Steam traps and separators  
Coal and fuel oil  
Transformer oil  
Lubricating oil; Steam cylinder oil  
Cotton waste; Wiping rags; Packing  
Waste washing machines

#### VII.—Engineering Department

##### 1. SURVEYING

Transits; Levels; Rods; Chains; Steel tapes

##### 2. DRAFTING

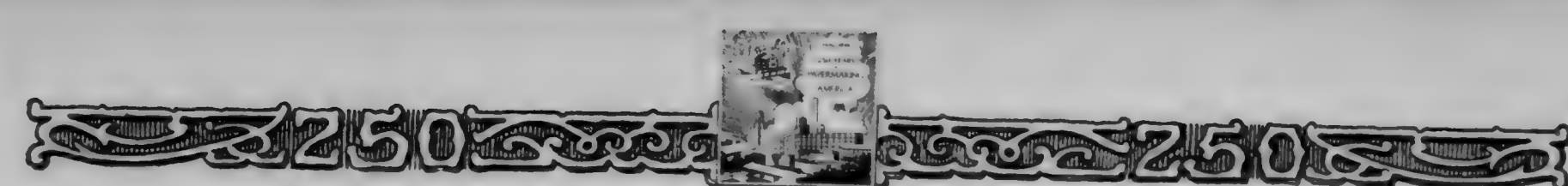
Drafting tables; Drafting instruments  
Drawing and tracing paper; Tracing linen  
Blueprinting machines; Blueprint paper  
Cameras and printing equipment

##### 3. CONSTRUCTION

General equipment and supplies for construction of dams, houses, offices, plant buildings and installation of machinery.

##### 4. PATTERN SHOP

Pattern-making tools and supplies



##### 5. FOUNDRY

Equipment, tools and supplies

##### 6. BLACKSMITH SHOP

Forges; Anvils; Blacksmith's tools  
Power punch and shears  
Riveting hammers  
Horseshoeing tools

##### 7. MACHINE SHOP

###### *Equipment*

Portable hand and power operated and stationary power tools of all kinds  
Traveling cranes; Jib cranes; Chain blocks  
Drills; Lathes; Shapers in a few sizes; Electric drills  
Boring mills; Milling machines; Key Seat-ers; Gear cutters  
Roll grinders; Roll calipers  
Knife grinders; Saw sharpening machines  
Metal saws; Emery Wheels  
Portable electric drills; Air hammers  
Portable hydraulic forcing presses  
Screw Jacks; Hydraulic jacks  
Pipe cutting and Treading machines and hand tools  
Valve reseating tools  
Bolt cutters  
Oxyacetylene and Electric cutting and welding equipment  
Metal saws  
Gas generators; Carbide  
Paint spraying machines  
Cement guns  
Tachometers; Thickness gages; Calipers

##### 8. CARPENTER SHOP

General carpenter shop equipment  
Circular and band saws; Planers; Molders  
Carpenter's hand tools  
Wood plug machines; Wood core making machines

##### 9. ELECTRICAL SHOP

Lineman's climbers and tools; Wire pullers  
Conduit; insulators  
Insulated wire  
Receptacles; Brushes; Fuses  
Switches; Lamps; Lamp guards; Flashlights.

##### 10. MAINTENANCE AND SUPPLIES

###### *Power Transmission*

Shafting; Hangers and stands; Bearings; Bushings; Oil and grease cups  
Pulleys of iron, Steel and Paper  
Belt tighteners; Speed reducers  
Gears and pinions; Miter and mortise gears  
Rope sheaves; Sprockets  
Shaft couplings; Flexible couplings; Friction couplings  
Clutch couplings; Magnetic clutch couplings

Transmission rope  
Transmission belting  
Leather; Rubber; Balata; Camels hair; Canvas  
Conveyor belting  
Rubber; Canvas; Steel  
Conveyor chains and attachments  
Detachable and riveted  
Wire cable and attachments  
Belt hooks and lacing; Belt dressing; Rope dressing

###### *Supplies*

Spare machinery parts  
Pipe couplings; Unions; Flanges; Elbows; Bends; Angles; Crosses  
Packing  
Rubber; Asbestos; Flax; Metallic  
Gaskets  
Fire doors; Wire glass; Steel sash  
Ventilators  
Expanded metal and Woven wire for guards  
Paint for wood and metal  
Tool steel  
Steel, Iron, Stainless steel, Bronze and Monel metal in rods, bars and sheets  
Cutting compound  
Kerosene; Gasoline  
Transformer oil  
Lubricating oil

#### VIII.—Laboratory

###### *Equipment*

##### 1. CHEMICAL ANALYSIS

Laboratory desks; Reagent cabinets; Hoods  
Hot plates; Muffle furnaces  
Balances and scales; Laboratory suction pumps  
Water stills; Extraction apparatus  
Chemical glassware; Equipment for volumetric analysis  
Standard screens; Gage testers; Specific gravity instruments  
Gas analysis equipment; Plastimeters; Stopwatch

##### 2. PULP TESTING

Sampling tools and containers  
Drying ovens  
Laboratory ball mills; Laboratory beaters  
Centrifuges; Freeness and slowness testers  
Sheetmaking machines  
Color comparison instruments; Stereopticons

##### 3. PAPER TESTING

Basis weight scales; Micrometers; Microscopes  
Bursting strength testers; Folding, Tearing and Tensile strength testers, &c.  
Size testers; Glarimeters; Tint photometers; Fadeometers, &c.







#### 4. COAL TESTING

Laboratory coal crushers and pulverizers  
Calorimeters; Standard thermometers

#### 5. OIL TESTING

Viscosimeters; Fire and flash testers

#### 6. CEMENT TESTING

Equipment

#### 7. BELT TESTING

Equipment

#### 8. METEOROLOGICAL EQUIPMENT

Maximum and minimum thermometers; Hygrometers; Anemometers  
Barometers; Precipitation measurement instruments

#### 9. SUPPLIES

C. P. Chemicals; Filter Paper; Glassware  
General laboratory supplies

### IX.—Administration and General

#### EQUIPMENT

Desks; Chairs; Filing cabinets; Safes; Safe cabinets

Dictaphones

Typewriters; Calculating machines; Book-keeping machines; Check writers

Photostat machines

Duplicating machines

For the plants:

Sprinkler systems; Fire extinguishers; Fire hose, nozzles, etc.

Telephone systems; Electric clocks

Lightning rod equipment

Fencing; Safety signs

Time recorders; Watchman's clocks

Lockers, wash stands, shower baths

#### SUPPLIES

Lithographed and printed letterheads and envelopes

Typewriting paper; Carbon paper; Typewriter supplies

Pens; Inks; Pencils

General office supplies

For the plants:

Waterproof clothing

Rubber boots

Picks, shovels, axes, brooms, etc.

### X.—Town

#### 1. HOUSING

Ready cut housebuilding material; Cement;  
Brick; Hollow tile

Lath; Plaster; Insulating materials; Prepared Roofing, Shingles; Wallboard; Roofing

Heating furnaces and stoves; Cooking ranges  
Bathroom fixtures

House furnishings and furniture

#### 2. SCHOOL

Equipment and furniture, desks, &c.

#### 3. CHURCH

Furnishings and furniture

#### 4. HOSPITAL

Equipment for a small hospital  
Hospital beds; Operating tables  
Hospital and dispensary supplies

#### 5. WATER AND SEWAGE

Standpipe; Pumping equipment; Water pipe.  
Hydrants

Water meters; Chlorination and filtration equipment

Sewer pipe; Catchbasins; Garbage incinerators

#### 6. PUBLIC SAFETY

Police and fire protection equipment for village

Jail fixtures; Police uniforms

Fire engines; Fire hose and reels; Fire extinguishers; Gas masks.

#### 7. MERCHANDISING

Equipment, supplies and stocks for a general department store

#### 8. HOTEL AND BOARDING HOUSE

Complete equipment for sleeping rooms, bathrooms, dining room and kitchen

Hotel supplies

#### 9. LAUNDRY

Complete equipment and supplies for a steam laundry

#### 10. FARM

Land clearing equipment

Farm machinery and tools

Barn and stable equipment for dairy farm

Veterinary supplies



## Pulp and Paper Concerns in the U. S.

A LIST is presented herewith of the concerns in the United States, alphabetically according to states, making wood pulp and various kinds of paper or both. This list is printed here to fix in the record at this particular time the wide extent throughout the Union of the pulp and paper making industry 250 years after William Rittenhouse, the pioneer paper maker, established his mill in the United States.

As may be observed, some of the hundred of concerns represented in this list are located in every state in the Union with the exception of about a dozen. Because of the lack of space, the location, equipment and capacity of these mills are not given, but all of this information can be obtained from Lockwood's Directory of the Paper and Allied Trades.

### Alabama

Gulf States Paper Corp.  
Hollingsworth & Whitney Co.  
Mobile Paper Mill Co.  
National Gypsum Co.  
Southern Kraft Corp.

### Arkansas

Crossett Paper Mills  
Southern Kraft Corp.

### California

California-Oregon Paper Mills  
Certain-Teed Products Corp.  
Crown Zellerbach Corp.  
El Rey Products Co.  
Fernstrom Paper Mills, Inc.  
Fibreboard Products, Inc.  
Johns-Manville Products Corp.  
Paraffine Companies, Inc.  
Pioneer Div. The Flintkote Co.  
United States Gypsum Co.  
Volney Felt Mills, Inc.

### Colorado

Central Fibre Products Co., Inc.

### Connecticut

Burnside Co., Inc.  
Case Bros., Inc.  
Case Fiber Co.  
Case & Risley Press Paper Co.  
Colonial Board Co.  
Connecticut Fibre Board Co., Inc.  
Dexter, C. H., & Sons, Inc.  
Foulds, William, & Co., Inc.  
Inland Paper Board Co., Inc.  
Lydall & Foulds Paper Co., Inc.  
National Folding Box Co.  
New Haven Pulp & Board Co.  
Norton, C. H., Co.  
Parker, Joseph, & Son Co.  
Pond's Extract Co.  
Raybestos-Manhattan, Inc.  
Reclamation Co. of America  
Red Mill Paper Board Co.  
Robertson Paper Box Co., Inc.  
Rogers Paper Mfg. Co.

### St. Joe Paper Co.

Sanitary Paper Mills, Inc.  
Setag Paper Mills, Inc.  
Sterling Shoe Fibre Co.  
Sterlite Fibre Products, Inc.  
Stevens Paper Mills, Inc.  
Union Box Board Co., Inc.  
Wyoming Valley Paper Mill

### Delaware

Container Corp. of America  
Curtis Paper Co.  
Marshall Bros., Inc.  
National Vulcanized Fibre Co.  
San-Nap-Pak Mfg. Co.

### District of Columbia

District of Columbia Paper Mills, Inc.

### Florida

Armstrong Cork Co.  
Container Corp. of America  
Florida Pulp & Paper Co.  
Miami Mills, Inc.  
National Container Corp.  
Rayonier Inc.  
St. Joe Paper Co.  
Southern Kraft Corp.

### Georgia

Atlantic Paper & Pulp Corp.  
Brunswick Pulp & Paper Co.  
National Paper Co.  
Noble Mfg. Co.  
St. Marys Kraft Corp.  
Union Bag & Paper Corp.

### Hawaiian Islands

Hawaiian Cane Products, Ltd.  
Olaa Sugar Co.

### Illinois

Alton Box Board Co.  
American Asphalt Roof Corp.  
Atlas Leather Co.  
Ball Bros. Co.  
Barrett Co.

### Bemis Bro. Bag Co.

Burgess Cellulose Co.  
Central Fire Products Co., Inc.  
Certain-Teed Products Corp.  
Consolidated Paper Co.  
Container Corp. of America  
Hopper Paper Co.  
Johns-Manville Corp. of Delaware  
Lehon Co.  
Masonite Corp.  
Morris Paper Mills  
National Biscuit Co.  
Prairie State Paper Mills, Inc.  
Quaker Oats Co.  
Rockton Felt & Paper Co.  
Ruberoide Co., The  
Southern Kraft Corp.  
Standard Asbestos Mfg. Co.  
Terre Haute Paper Co.  
Waterway Board & Paper Co.

### Indiana

Alton Box Board Co.  
America Coating Mills, Inc.  
Ball Bros. Co.  
Beveridge Paper Co., The  
Central Fibre Products Co., Inc.  
Chillicothe Realty Co.  
Container Corp. of America  
Fort Wayne Corrugated Paper Co.  
Hinde & Dauch Paper Co.  
Fibre Form, Inc.  
Funke, Ferdinand, Sons Co.  
Hartford City Paper Co.  
Kieffer Paper Mills  
South Bend Paper Mill, Inc.  
Southern Kraft Corp.  
Terre Haute Paper Co., The  
Volney Felt Mills, Inc.

### Iowa

Albemarle-Chesapeake Co., Inc.  
Hinde & Dauch Paper Co.  
Maizewood Insulation Co.

### Kansas

Central Fibre Products Co., Inc.  
Lawrence Paper Co.





## PULP AND PAPER CONCERNS IN U. S.—Continued

### Louisiana

Brown Paper Mill Co., Inc., The  
Calcasieu Sulphate Paper Co.  
Celotex Corp.  
Flintkote Co.  
Gaylord Container Corp.  
Southern Advance Bag & Paper Co., Inc.  
Southern Kraft Corp.

### Maine

Eastern Corp.  
Fraser Paper, Ltd.  
Great Northern Paper Co.  
Hollingsworth & Whitney Co.  
International Paper Co.  
Kennebec Pulp & Paper Co.  
Keyes Fibre Co.  
Maine Seaboard Paper Co.  
Northern Kraft Corp.  
Old Town Co.  
Oxford Paper Co.  
Pejepscot Paper Co.  
Penobscot Chemical Fibre Co.  
Rogers Fibre Co., Inc.  
St. Croix Paper Co.  
Sherman & Co.  
Supertex Corp.  
United Paperboard Co.  
United States Gypsum Co.  
Warren, S. D., Co.  
Waterfalls Paper Mills

### Maryland

Acme Paper Board Co.  
Bartgis Bros. Co.  
Chesapeake Paperboard Co.  
Congoleum-Nairn, Inc.  
Elk Paper Mfg. Co.  
Fager, Charles, & Son  
Jessup & Moore Paper Co.  
Schmidt & Ault Paper Co.  
West Virginia Pulp & Paper Co.  
Young, Ernest R., & Son

### Massachusetts

Adams, A. L., Paper Co.  
Advertisers Paper Mills  
American Tissue Mills, Inc.  
American Writing Paper Corp.  
Bird & Son, Inc.  
Brightwater Paper Co.  
Brown, L. L., Paper Co.  
Carew Mfg. Co.  
Champion-International Co.  
Chemical Paper Mfg. Co.  
Collins Mfg. Co.

### Commonwealth Supplies Co.

Crane & Co., Inc.  
Crehore, C. F., & Son  
Crocker, Burbank & Co., Ass'n.  
Crocker-McElwain Co.  
Deerfield Glassine Co.  
Dighton Mfg. Co.  
Du Pont de Nemours, E. I., & Co.  
Erving Paper Mills  
Esleek Mfg. Co.  
Falulah Paper Co.  
Federated Mills, Inc.  
Fitchburg Paper Co.  
Franklin Paper Co.  
Groton Leather Board Co.  
Haverhill Boxboards, Div. of

Robert Gair Co., Inc.  
Hollingsworth & Vose Co.  
Hurlbut Paper Co.  
Jenkins, George O., Co.  
Keith Paper Co.  
Little, Arthur D., Inc.  
Livingston Fibre Board Co., Inc.  
Mead Corp.  
Merrimac Paper Co., Inc.  
Millers Falls Paper Co.  
Mount Tom Sulphite Pulp Co.  
Mountain Mill Corp.  
Munroe Paper Corp.  
Nashua River Paper Co.  
Natick Box & Board Co.  
New England Pulp & Paper Co.  
Newton Paper Co.

Pairpoint Corp., The  
Parsons Paper Co.  
Rhode Island Card Board Co.  
Rising Paper Co.  
San-Nap-Pak Mfg. Co.  
Smith Paper, Inc.  
Southworth Co.  
Spaulding Fibre Co., Inc.  
Stevens Paper Mills, Inc.  
Stony Brook Paper Co.  
Strathmore Paper Co.  
Taylor-Logan Co., Paper Makers  
Tileston & Hollingsworth Co.  
Valley Paper Co.  
Westfield River Paper Co., Inc.  
Weston, Byron, Co.  
Whiting Paper Co.  
Worthy Paper Co. Association

### Michigan

Allied Paper Mills  
American Box Board Co.  
American Can Co.  
Bryant Paper Co.  
Central Paper Co., Inc.

### Consolidated Paper Co.

Detroit Paper Products Corp.  
Detroit Sulphite Pulp & Paper Co.  
Dunn Sulphite Paper Co.  
Eddy Paper Corp.  
Escanaba Paper Co.  
Filer Fibre Co.  
Fletcher Paper Co.  
Ford Motor Co.  
French Paper Co.  
Hawthorne Paper Co.  
Hoskin Paper Co.  
Kalamazoo Paper Co.  
Kalamazoo Vegetable Parchment Co.

Lee Paper Co.  
Mac Sim Bar Paper Co.  
Manistique Pulp & Paper Co.  
Michigan Carton Co.  
Michigan Co. of Plainwell  
Monroe Paper Co., Inc.  
Monroe Paper Products Co.  
Multicolor Packages, Inc.  
Munising Paper Co., The  
North American Pulp & Paper Corp.

Ontonagon Fibre Corp.  
Otsego Falls Paper Mills, Inc.  
Peninsular Paper Co.  
Port Huron Sulphite & Paper Co.  
Rex Paper Co.  
River Raisin Paper Co.  
Rochester Paper Co.  
Simplex Paper Corp.  
Southern Kraft Corp.  
Stronach Paper Co.  
Sutherland Paper Co.  
Watervliet Paper Co.

### Minnesota

Blandin Paper Co.  
Hennepin Paper Co.  
Minnesota & Ontario Paper Co.  
Nelson, B. F., Mfg. Co.  
Northwest Paper Co., The  
Waldorf Paper Products Co.  
Watab Paper Co.  
Wood Conversion Co.

### Mississippi

Flintkote Co.  
Masonite Corp.  
Southern Kraft Corp.  
United States Gypsum Co.

### Missouri

United States Gypsum Co.

## PULP AND PAPER CONCERNS IN U. S.—Continued

### New Hampshire

Amoskeag Paper Mills Co.  
Ashland Paper Mill, Inc.  
Ashuelot Paper Co.  
Brown Co.  
Claremont Paper Co., Inc.  
Contoocook Valley Paper Co.  
Coy Paper Co.  
Cushman-Rankin Co.  
Davis Paper Co.  
Fisk Paper Co. Div. of Hinsdale Paper Mfg. Co.  
Groveton Papers Co.  
Hinsdale Paper Mfg. Co.  
Milton Leather Board Co.  
Monadnock Paper Mills  
Morley Button Mfg. Co.  
Norton, F. E., & Sons, Inc.  
Parker-Young Co.  
Penacook Fibre Co.  
Robertson Co.  
Robertson, G. E., & Co.  
Seaboard Fibre Co.  
Spaulding Fibre Co., Inc.  
Wyoming Valley Paper Mill

### New Jersey

Asbestos Limited, Inc.  
Barrett Co.  
Bogota Paper & Board Corp.  
Boyle, John F., Co.  
Bude-Mar Mills & Mfg. Co.  
Clifton Paper Board Co.  
Continental Paper Co.  
Davey Co., The  
Fandango Mills  
Federal Paper Board Co., Inc.  
Flintkote Co.  
Hamersley Mfg. Co., Inc., The  
Hinde & Dauch Paper Co.  
Homasote Co.  
Johns-Manville Corp.  
Johnson & Johnson  
Kenilworth Mfg. Co., Inc.  
Kieckhefer Container Co.  
Lowe Paper Co.  
MacAndrews & Forbes Co.  
Marcal Pulp & Paper Co., Inc.  
McEwan Bros., Inc.  
McEwan, R. B., & Son  
Newark Boxboard Co.  
Old Reliable Mills  
Penquannock Valley Paper Co.  
Riegel Paper Corp.  
Ruberoide Co.  
Schweitzer, Peter J., Inc.  
Smith & Kanzler, Inc.

Sonoco Products Co.  
Sterling Paper Converting Co.  
United States Gypsum Co.  
West Jersey Paper Mfg. Co.  
Whippany Paperboard Co., Inc.

### New York

A. P. W. Paper Co., Inc.  
Adirondack Pulp & Paper Corp.  
Albia Box & Paper Co.  
Algonquin Paper Corp.  
American Fibre Chair Seat Corp.  
American Wood Board Co.  
Ancram Paper Mills  
Armstrong Cork Co.  
Atlantic Asbestos Corp.  
Berst-Forster-Dixfield Co., Inc.  
Berwin Paper Corp.  
Blandy Paper Co.  
Bloomer Bros. Co.  
Brownville Board Co.  
Brownville Paper Co.  
Burrows Paper Corp.  
Carthage Paper Makers, Inc.  
Certain-Teed Products Corp.  
Central Hudson Paper Mills, Inc.  
Columbia Box Board Mills, Inc.  
Continental Paper Co.  
Cottrell Paper Co., Inc.  
Dexter Sulphite Pulp & Paper Co.  
Diamond Mills Paper Co., Inc.  
Eastman Kodak Co.  
Edsall Paper Corp.  
Electric City Paper Mills, Inc.  
Endicott-Johnson Corp.  
Fibre Conduit Co.  
Fibre Forming Corp.  
Finch, Pruyn & Co., Inc.  
Flintkote Co.  
Flower City Tissue Mills Co.  
Fort Miller Pulp & Paper Co.  
Fort Orange Paper Co.  
Foster Paper Co., Inc.  
Fox, W. H., & Sons, Inc.  
Frost-White Paper Mills, Inc.  
Gair Cartons, Div. Robert Gair Co., Inc.  
Gair, Robert, Co., Inc.  
Genesee Paper Mills, Inc.  
Gotham Paper Mills, Inc.  
Gould Paper Co.  
Grand Bag & Paper Co., Inc.  
Hoombeek's, John C., Sons  
Imperial Paper & Color Corp.  
International Paper Co.  
Iroquois Paper Co., Inc.  
Island Paper Co., The  
Johnston Pulp Corp.

Kieckhefer Container Co.  
Kimberly-Clark Corp.  
Knowlton Bros.  
Latex Fibre Industries, Inc.  
Lawless Bros. Paper Mills, Inc.  
Lewis, J. P., Co., The  
Little Falls Paper Co., Inc.  
Malone Special Papers Inc.  
Manning, John A., Paper Co., Inc.  
Martin Pulp & Paper Co.  
McIntyre Bros. Paper Co., Inc.  
Midvale Paper Board Co., Inc.  
Modern Tissues Corp.  
Mohawk Paper Mills, Inc.  
Mohawk Valley Paper Co., Inc.  
Moyer & Pratt, Inc.  
Muessman Paper Co.  
Mutual Boxboard Co.  
National Cellulose Corp.  
National Gypsum Co.  
National Mfg. Corp.  
National Paper Products Co.  
New York & Pennsylvania Co., Inc.  
Newton Falls Paper Mill  
North End Paper Co.  
Onondaga Paper Co.  
Oswego Falls Corp.  
Oswego River Paper Mills  
Phoenix Toilet & Paper Mfg. Co., Inc.  
Racquette River Paper Co.  
Read Paper Co., Inc.  
Read, Robert E., Inc.  
Riegel Paper Corp.  
River Valley Tissue Mills, Inc.  
Rogers, J. & J., Co.  
Rondout Paper Mills, Inc.  
Rushmore Paper Mills, Inc.  
St. Regis Paper Co.  
Schroon River Pulp & Paper Co.  
Senoso Paper Co., Inc.  
Sitroux Co., Inc.  
Smeallie & Voorhees, Inc.  
Snyder, W. W., Mfg. Co., Inc.  
Spaulding Fibre Co., Inc.  
Stevens & Thompson Paper Co.  
Stillwater Tissue Mills, Inc.  
Superfine Paper Mills, Inc.  
Sweet Bros. Paper Mfg. Co., Inc.  
Taggart Corp.  
Thomas Paper Corp.  
Tonawanda Boxboards, Div. of Robert Gair Co., Inc.  
United Paperboard Co.  
United States Gypsum Co.  
Union Bag & Paper Corp.  
Upson Co., The





## PULP AND PAPER CONCERNS IN U. S.—Continued

Veldown Co., Inc.  
Velvet Tissue Products Co., Inc.  
Victoria Paper Mills Co.  
Volney Felt Mills, Inc.  
West Virginia Pulp & Paper Co.  
Wood Flong Corp.

### North Carolina

Carolina Fiber Co.  
Champion Paper & Fibre Co.  
Ecusta Paper Corp.  
Halifax Paper Co., Inc.  
Manchester Board & Paper Co., Inc.  
North Carolina Pulp Co.  
Riegel Paper Corp.  
Sonoco Products Co.  
Silva Paperboard Co.

### Ohio

Aetna Paper Co., The  
Auglaize Box Board Co.  
Albemarle-Chesapeake Co., Inc.  
Bauer Bros. Co.  
Beckett Paper Co., The  
Carey, Philip, Mfg. Co.  
Cellulo Co., Inc.  
Champion Paper & Fibre Co.  
Chase Bag Co.  
Cheney Pulp & Paper Co.  
Chillicothe Paper Co.  
Chillicothe Realty Co.  
Crystal Tissue Co.  
Cincinnati Paper Board Co.  
Container Corp. of America  
Coshocton Straw Paper Co.  
Dresden Paper Mill Co.  
Fairfield Paper Co.  
Fox Paper Co.  
Franklin Board & Paper Co.  
Gardner-Richardson Co.  
Godman, H. C., Co.  
Harding-Jones Paper Co.  
Hinde & Dauch Paper Co.  
Howard Paper Co., The  
Jaite Co., The  
Liberty Paper Board Co., Inc.  
Logan-Long Co.  
Massillon Paper Co.  
Maxwell Paper Co.  
Mead Corp.  
Miamisburg Paper Co.  
Munroe Falls Paper Co.  
Muskingum Fiber Products Corp.  
Ohio Box Board Co.  
Ohio Paper Co.  
Ohio Wax Paper Co.

Oxford Miami Paper Co.  
Phillips, Thos., Co.  
Queen City Paper Co.  
Sall Mountain Co.  
Sorg Paper Co.  
Southern Kraft Corp.  
Toronto Paper Mfg. Co.  
United Paperboard Co.  
United States Gypsum Co.  
Walsh Paper Co., Inc.  
Wardlow-Thomas Paper Co.  
Weaver-Wall Co.  
Wrenn Paper Co.

### Oregon

Coos Bay Pulp Corp.  
Crown Willamette Paper Co.  
Fir-Tex Insulating Board Co.  
Hawley Pulp & Paper Co.  
Oregon Pulp & Paper Co.  
St. Helens Pulp & Paper Co.  
Spaulding Pulp & Paper Co.

### Pennsylvania

Acme Paper Board Co.  
Atlas Paper Mfg. Co.  
Bare, D. M., Paper Co.  
Bayless Pulp & Paper Corp.  
Beach & Arthur Paper Co.  
Bicking, S. Austin, Paper Mfg. Co.  
Castanea Paper Co.  
Certain-Teed Products Corp.  
Container Corp. of America  
Continental-Diamond Fibre Co.  
Daring, C. B., Paper Mfg. Co.  
Davey Co., The  
Dill & Collins, Inc.  
Downingtown Paper Co.  
Durham Paper Board Co., Inc.  
Eagle Paper Mills  
Eaton-Dikeman Co.  
Eden Paper Co.  
Edgemont Paper Co., Inc.  
General Paper Co., Inc.  
Glassine Paper Co.  
Glatfelter, P. H., Co.  
Hammermill Paper Co.  
Hamilton, W. C., & Sons, Inc.  
Huntington Mills Paper Co.  
Keasbey & Mattison Co.  
Lysle, Wilson, Estate of  
Mazer Paper Mills, Inc.  
McDowell Paper Mills Div. of  
Glassine Paper Co.  
Morgan Paper Co.  
Mount Holly Paper Mill

New York & Pennsylvania Co., Inc.  
Norristown Magnesia & Asbestos Co.  
Paper Products Mfg. Co.  
Paterson Parchment Paper Co.  
Phil-Fibre Box Board Mills, Inc.  
Pittston Paper Corp.  
Ransom Paper Co.  
Rieser Co., Inc.  
Ruberoide Co.  
Schmidt & Ault Paper Co.  
Scott Paper Co.  
Southern Kraft Corp.  
Specialty Paperboard Mills, Inc.  
Shryock Bros.  
Tarentum Paper Mills  
Taylor Fibre Co.  
Union Mills Paper Mfg. Co.  
United States Gypsum Co.  
United States Paper Mills, Inc.  
West Branch Paper Mill  
West Virginia Pulp & Paper Co.  
York Paper Mfg. Co., Inc.

### Philippine Islands

Compania De Celulosa De Filipinas, Inc.

### Rhode Island

Bird & Son, Inc.

### South Carolina

Carolina Fiber Co.  
Sonoco Products Co.  
Southern Kraft Corp.  
West Virginia Pulp & Paper Co.

### Tennessee

Andrews, O. B., Co.  
Buckeye Cotton Oil Co.  
Harriman Co.  
Mead Corp.  
Southern Chemical Cotton Co.  
Southern Extract Co.  
Tennessee Paper Mills, Inc.  
Tennessee Valley Paper Mills, Inc.

### Texas

Champion Paper & Fibre Co.  
Fleming & Sons, Inc.  
Orange Pulp & Paper Mills, Inc.  
Southland Paper Mills, Inc.

### Vermont

Adams Paper Co., Inc.



## PULP AND PAPER CONCERNS IN U. S. — Continued

Blake & Higgins Co., Inc., The  
Fillmore & Slade, Inc.  
Gilman Paper Co.  
Kelley Paper Corp.  
Missisquoi Corp.  
Moore & Thompson Paper Co., Inc.  
Putney Paper Co.  
Ryegate Paper Co.

### Virginia

Albemarle-Chesapeake Co., Inc.  
Albemarle Paper Mfg. Co.  
Bedford Pulp & Paper Co.  
Chesapeake-Camp Corp.  
Chesapeake Corp.  
Columbian Paper Co.  
Eddy Paper Corp.  
Hercules Powder Co.  
Mummel-Ross Fibre Corp.  
Johns-Manville Corp.  
Manchester Board & Paper Co.  
Mead Corp.  
Standard Paper Mfg. Co.  
West Virginia Pulp & Paper Co.

### Washington

Berkheimer, J. E., Mfg. Co.  
Columbia River Paper Mills  
Crown Willamette Paper Co.  
Everett Pulp & Paper Co.  
Fibreboard Products, Inc.  
Grays Harbor Pulp & Paper Co.

Inland Empire Paper Co.  
Longview Fibre Co.  
National Paper Products Co.  
Pacific Coast Paper Mills  
Pacific Straw Paper & Board Co.  
Pulp Division Weyerhaeuser Timber Co.  
Puget Sound Pulp & Timber Co.  
Rayonier Inc.  
St. Regis Kraft Co.  
Soundview Pulp Co.  
Tumwater Paper Mills Co.  
Washington Pulp & Paper Corp.

### West Virginia

Cherry River Paper Co.  
George, S., Co.  
Halltown Paper Board Co.  
Hammond Bag & Paper Co.  
Harvey Paper Mills Co.

### Wisconsin

Badger Paper Mills, Inc.  
Beloit Box Board Co.  
Bergstrom Paper Co.  
Combined Locks Paper Co.  
Consolidated Water Power & Paper Co.  
Cornell Wood Products Co.  
Falls Pulp & Paper Co.  
Flambeau Paper Co.  
Forest Products Laboratory,  
United States Department of  
Agriculture, Forest Service

Fort Howard Paper Co.  
Fox River Paper Corp.  
Gilbert Paper Co.  
Hoberg Paper Mills, Inc.  
Hummel & Downing Co.  
Institute of Paper Chemistry  
Kimberly-Clark Corp.  
Little Rapids Pulp Co.  
Marathon Paper Mills Co.  
Mosinee Paper Mills Co.  
Nekoosa Paper Co.  
Nekoosa Edwards Paper Co., Inc.  
Nicolet Paper Corp.  
Northern Paper Mills  
Outagamie Mill  
Peavey Paper Products Co.  
Rhineland Paper Co.  
Riverside Paper Corp.  
Southern Kraft Corp.  
Sterling Pulp & Paper Co.  
Stevens Point Pulp & Paper Co.  
Strange, John, Paper Co.  
Thilmany Pulp & Paper Co.  
Tomahawk Kraft Paper Co.  
Tomahawk Pulp Co.  
U. S. Paper Mills Corp.  
Ward Paper Co.  
Wausau Paper Mills Co.  
Whiting, Geo. A., Paper Co.  
Whiting-Plover Paper Co.  
Wisconsin River Paper & Pulp Co.  
Wisconsin Tissue Mills  
Wolf River Paper & Fiber Co.

## Officers of the Paper Concerns in U. S.

A LIST is presented herewith of the officers of the companies who own pulp and paper mills in the United States at the present time. This impressive list of the names of hundreds of men now engaged in the manufacture of paper is in striking contrast to the few men who were associated with

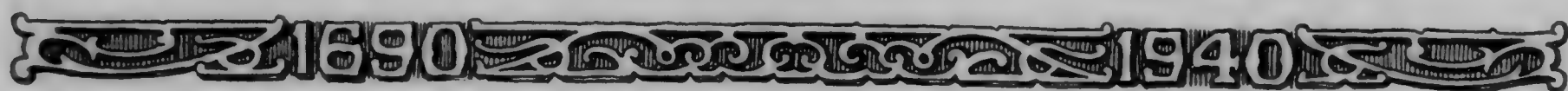
the industry in its infancy just two and one-half centuries ago. Lack of space prevents giving the names of the companies with which these men are connected, but this information can be fully obtained from Lockwood's Directory of the Paper and Allied Trades.

### A

Abbott, De Verne, Vice-Pres.  
Abraham, Herbert, Pres.  
Adams, A. L., Pres.  
Adams, C. J., Vice-Pres. and Treas.  
Adams, J. A., Vice-Pres.  
Adams, J. F., Pres.  
Adie, John F., Pres. and Treas.  
Aerts, R., Treas.  
Afferbach, M. W., Vice-Pres.

Ahrens, Edw. K., Sec.  
Alexander, Ben, Pres., Chairman of Board  
Alexander, J. E., Pres.  
Alford, W. J., Jr., Pres. and Treas.  
Allen, Horace E., Sec.  
Allen, J. H., Pres.  
Allen, John M., Pres.  
Allen, Philip R., Chairman of the Board

Allen, Sarah, Sec.  
Allison, O. M., Sec.-Treas.  
Alston, C. P., Pres.  
Altick, C. D., Pres.  
Amdur, Dora, Treas.  
Amdur, Jacob, Pres.  
Amdur, Simon, Sec.  
Ancona, F. W., Vice-Pres.  
Anders, William H., Pres. and Treas.  
Anderson, A. H., Sec.-Treas.





## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

Anderson, F. R., Vice-Pres.  
Anderson, Ossian, Pres., Exec. Vice-Pres.  
Andrews, C. K., Vice-Pres. and Treas.  
Andrews, F. R., Treas.  
Andrews, J. J., Sec.  
Anthony, J. Harlan, Treas.  
Arkell, Bartlett, Pres.  
Armstrong, Dwight L., Vice-Pres.  
Arndt, J. M., Vice-Pres.  
Arnold, L. J., Treas.  
Ash, Frank C., Vice-Pres. and Treas.  
Asmuth, A. W., Pres.  
Atwood, H. E., Vice-Pres.  
Augsbury, B. S., Vice-Pres.  
Augsbury, F. A., Pres.  
Aull, J. A., Pres.  
Aull, J. A., Jr., Vice-Pres. and Treas.  
Avery, Sewell L., Chairman  
Avery, T. M., Vice-Pres.  
**B**  
Babcock, B. L., Treas.  
Babcock, Guy O., Vice-Pres.  
Babson, Robert W., Vice-Pres.  
Bachert, K. W., Pres. and Treas.  
Bachert, W. H., II, Sec.  
Bachman, P. R., Vice-Pres.  
Backes, C. B., Treas.  
Bacon, Frank R., Pres.  
Bagg, Aaron C., Pres.  
Bagg, John L., Pres. and Treas.  
Bailey, Sidney, Vice-Pres.  
Baker, C. M., Pres.  
Baker, M. H., Pres.  
Baker, R. F., Pres. and Treas.  
Baldwin, H. R., Vice-Pres.  
Ball, F. Arthur, Vice-Pres.  
Ball, Edmund F., Vice-Pres.  
Ball, Edward, Pres.  
Ball, F. C., Pres.  
Ball, G. A., Vice-Pres.  
Ball, William H., Vice-Pres.  
Ballenberg, A. G., Treas.  
Ballin, Chas., Treas.  
Ballister, F. E., Pres. and Treas.  
Bankus, Albert, Vice-Pres.  
Barbare, N. J., Treas.  
Barbash, H. L., Sec.  
Barclay, Irene Long, Sec.  
Bardeen, Maxwell D., Pres.  
Barnard, C. E., Sec.-Treas.  
Barthton, G. Howard, Pres.  
Baruh, J. Y., Vice-Pres.  
Bast, O. D., Sec.  
Bast, Paul C., Vice-Pres., Sec.-Treas.  
Bauer, Chas. L., Pres.  
Baum, Geo., Vice-Pres. and Treas.  
Baum, Isador, Pres.  
Baumgartner, H. C., Treas.  
Beal, J. E., Vice-Pres.  
Bearce, E. F., Vice-Pres.  
Beardslee, A. T., Vice-Pres.  
Beasley, B., Sec.  
Bechtel, J. A., Vice-Pres.  
Becker, Folke, Pres. and Treas.  
Beckett, Guy H., Vice-Pres.  
Beckett, Mary M., Pres.  
Beckett, William, Treas.  
Beckley, James E., Vice-Pres.  
Beckwith, W. H., Vice-Pres.  
Begle, Ned G., Treas.  
Behnke, H. J., Sec.  
Behnke, J. H., Sec.  
Behrend, Otto F., Treas.  
Bell, Arthur F., Treas.  
Bellack, R. F., Exec. Vice-Pres.  
Bellinger, J. Erwin, Sec.  
Bellows, John N., Treas.  
Bemis, F. G., Pres.  
Bennett, E. G., Treas.  
Benson, M. G., Vice-Pres.  
Bergstresser, H. F., Vice-Pres.  
Bergstrom, J. N., Pres. and Treas.  
Bergstrom, N. H., Vice-Pres. and Sec.  
Berry, W., Sec.  
Bersch, Wm., Vice-Pres.  
Bertschy, Raymond P., Sec.  
Beston, Arthur, Treas.  
Beyer, R. B., Sec.  
Bickelhaupt, G. B., Pres.  
Biddle, E. O., Treas.  
Bidwell, George, Sec.-Treas.  
Bidwell, George L., Vice-Pres.  
Birmingham, J. E., Sec.-Treas.  
Bishop, Byron, Sec.  
Bisbee, Spaulding, Treas.  
Bitz, F. W., Sec.  
Blackley, W. J., Vice-Pres.  
Blackman, H. E., Treas.  
Blackwell, W. H., Treas.  
Blake, E. L., Sec.  
Bland, T. Noel, Vice-Pres.  
Blandin, C. K., Pres.  
Blandy, D. E., Vice-Pres.  
Blandy, Graham, 2nd, Pres.  
Blandy, I. C., Pres. and Treas.  
Bliss, Gorham, Pres. and Treas.  
Bliss, Theodore, Sec.  
Bloch, Louis, Chairman of Board  
Blodgett, T. H., Chairman of Board  
Blum, G. A., Sec.  
Blume, A. L., Vice-Pres.  
Board, C. E., Vice-Pres. and Treas.  
Bonin, P. E., Treas.  
Boswell, L. P., Sec.  
Boulware, L. R., Vice-Pres.  
Bowerfind, H. J., Chairman of Board  
Bowers, George W., Pres.  
Boyce, Charles W., Vice-Pres.  
Boyd, Charles S., Pres. and Treas.  
Boyd, R. E., Vice-Pres.  
Boyle, James J., Sec.  
Boyle, John F., Jr., Vice-Pres.  
Boynton, W. P., Sec.  
Brabson, J. M., Sec.  
Bracewell, R. S., Sec.  
Bracken, Alexander M., Treas.  
Bracker, Mrs. Emma, Sec.  
Bradford, Harry C., Vice-Pres. and Sec.  
Braginton, C. A., Treas.  
Brannan, John, Pres.  
Bratton, U. S., Jr., Pres. and Treas.  
Braun, Carl E., Vice-Pres.  
Brener, M. F., Sec.-Treas.  
Brennan, J. B., Pres.  
Brewer, Frank, Vice-Pres.  
Bright, J. W., Pres.  
Bright, Lloyd S., Owner  
Brisbois, N. M., Vice-Pres.  
Bromley, W. F., Sec.  
Bronson, Frederic E., Pres.  
Brooks, H. L., Vice-Pres. and Sec.  
Brossard, J. J., Vice-Pres.  
Brown, Clinton W., Pres.  
Brown, D. K., 1st Vice-Pres.  
Brown, Mrs. E. W., Vice-Pres.  
Brown, E. W., Jr., Vice-Pres.  
Brown, F. E., Vice-Pres. and Treas.  
Brown, Harold D., Sec.  
Brown, H. J., Pres.  
Brown, H. L., Pres.  
Brown, H. T., Vice-Pres.  
Brown, J. Bruce, Pres.  
Brown, Joseph, Vice-Pres.  
Brown, L. H., Pres.  
Brown, Martin A., Treas.  
Brown, O. B., Vice-Pres., Sec. and Treas.  
Brown, Robert E., Pres. and Treas.  
Browne, Paul, Sec.  
Browning, Dwight L., Pres.  
Bruff, James L., Sec.  
Brust, W. T., Treas., Vice-Pres.  
Bryan, C. M., Vice-Pres.  
Buchanan, W. E., Sec.  
Buehler, H., Jr., Vice-Pres. and Treas.

## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

Buehler, N., Sec.  
Buell, J. A., Vice-Pres.  
Bugge, S. B., Vice-Pres.  
Bull, Karlh, Sec.  
Bullen, Charles, Treas.  
Burgstresser, A. K., Pres.  
Burkhardt, F. T., Vice-Pres.  
Burrell, Loomis, Vice-Pres.  
Burrows, A. A., Pres.  
Burrows, C. H., Pres.  
Bush, S. L., Treas.  
Butterworth, E. R., Vice-Pres.  
Byerly, Albert W., Sec.  
Byrne, H. J., Treas.  
**C**  
Cahill, T. A., Sec.-Treas.  
Calder, Alexander, Pres.  
Caldwell, P. L., Vice-Pres.  
Caldwell, Robert, Vice-Pres.  
Calkins, Wm. B., Vice-Pres.  
Cameron, E. C. D., Sec.-Treas.  
Camp, J. L., Jr., Pres.  
Camp, J. M., Sec.-Treas.  
Campbell, Charles, Pres.  
Campbell, C. H., Vice-Pres.  
Campbell, C. S., Treas.  
Campbell, Murdoch, Sec.-Treas.  
Campbell, Wm., Pres.  
Campbell, William S., Vice-Pres.  
Canfield, Albert S., Sec.  
Cantine, Holley R., Pres.  
Carey, Charles E., Exec. Vice-Pres.  
Carey, D. P., Vice-Pres. and Treas.  
Carey, V. F., Sec.  
Carlisle, F. L., Chairman of Board  
Carlson, Milbert, Sec.  
Carmichael, G. T., Sec.-Treas.  
Carpenter, A. B., Treas.  
Carpenter, C. E., Vice-Pres.  
Carpenter, C. H., Vice-Pres.  
Carpenter, Mildred H., Vice-Pres.  
Carpenter, N. H., Pres.  
Carpenter, N. H., Jr., Treas.  
Carroll, J. K., Sec.  
Carter, Elliot A., Treas.  
Carter, W. L., Vice-Pres.  
Carter, Winthrop L., Pres.  
Case, Mrs. C. C., Pres.  
Case, Christopher M., Sec.-Treas.  
Case, Lawrence W., Pres. and Treas.  
Cashmore, Charles H., Pres. and Treas.  
Caskey, Paul D., Sec.  
Caspar, A. R., Vice-Pres.  
Cass, Charles A., Sec.  
Castle, H. A., Sec.-Treas.  
Catlin, Edgar S., Vice-Pres.  
Cayford, J. H., Vice-Pres.  
Chahoon, I. H., Pres.  
Chamberlin, S. Frank, Treas.  
Chapin, R. F., Vice-Pres.  
Chapleau, Gilbert J., Sec.  
Chapman, F. B., Treas.  
Chapman, Ralph W., Vice-Pres.  
Chappelle, K., Sec.  
Chase, E. W., Sec.  
Cheney, Howard L., Owner  
Cherry, H. T., Pres.  
Chisholm, Hugh J., Pres.  
Chiuminatto, P. M., Sec.-Treas.  
Christiansen, E. J., Sec.  
Christiansen, H. P., Vice-Pres.  
Clapham, A. R., Pres.  
Clapp, E. H., Treas.  
Clark, Alvin S., Treas.  
Clark, C. B., Pres.  
Clark, E. W., Pres.  
Clark, Robert C., Vice-Pres.  
Clark, W. G., Chairman  
Clark, William, Sec.  
Clason, Hans, Sec.  
Clifford, W. H., Treas.  
Clough, George H., Treas.  
Coale, B. W., Treas.  
Cocker, F. W., Sec.-Treas.  
Coe, Walter L., Treas.  
Coffin, Arthur D., Chairman of Board  
Coffin, Dexter D., Pres.  
Coffin, J. D., Pres.  
Cofrin, A. E., Pres. and Treas.  
Cohen, Abe., Part Owner  
Cohen, Joseph, Part Owner  
Cohen, Samuel J., Part Owner  
Cohen, William A., Vice-Pres.  
Coke, John S., Sec.  
Coker, C. W., Vice-Pres.  
Coker, James L., Pres.  
Coker, Richard G., Pres.  
Cole, M. L., Sec.-Treas.  
Coleman, H. F., Sec.-Treas.  
Colgrove, Mrs. A. N., Vice-Pres.  
Collins, Henry, Vice-Pres.  
Collins, H. C., Pres.  
Collins, W. A., Pres.  
Combiner, F. P., Vice-Pres.  
Comins, Raymond C., Treas.  
Compton, B. H., Vice-Pres.  
Compton, J. C., Pres.  
Comstock, W. J., Treas.  
Conklin, H. B., Pres.  
Conklin, H. F., Vice-Pres.  
Conrad, Chas. H., Sec.-Treas.  
Conrad, C. W., Vice-Pres.  
Conway, Joseph M., Pres.  
Conway, Stanley, Sec.-Treas.  
Cook, E. H., Pres.  
Cook, George R. III, Vice-Pres.  
Cooke, N., Sec.-Treas.  
Cooley, Elmer B., Treas.  
Coolidge, H. H., Vice-Pres.  
Coolidge, J. B., Sec.  
Coolin, W. S., Vice-Pres.  
Cooper, B. H., Treas.  
Copeland, Stuart B., Pres.  
Corbett, Harry C., Pres.  
Cormil, John, Vice-Pres.  
Cornwall, E. C., Sec.-Treas.  
Cosgrove, F. A., Treas.  
Costello, Floyd C., Vice-Pres.  
Costello, J. J., Treas.  
Costigan, E. J., Vice-Pres.  
Cottrell, A. Frank, Pres.  
Cottrell, James T., Vice-Pres. and Sec.  
Cowan, C. P., Vice-Pres.  
Cowhill, Jos. H., Vice-Pres.  
Cowles, D. H., Vice-Pres.  
Cox, M. N., Sec.  
Coy, F. E., Sec.-Treas.  
Coy, J. H., Vice-Pres.  
Crabbs, G. D., Chairman of Board  
Crabbs, K. G., Vice-Pres. and Treas.  
Crabbs, R. B., Pres.  
Crabtree, David, Pres.  
Crabtree, Edwin S., Vice-Pres.  
Craig, B. J., Sec.  
Crandall, Millie L., Sec.-Treas.  
Crane, Frederick G., Vice-Pres.  
Crane, Winthrop M., Jr., Pres.  
Craven, Alice, Sec.  
Crawford, E. A., Pres.  
Crawford, W. S., Vice-Pres.  
Crocker, Charles T., Pres. and Treas.  
Crocker, Charles T., III, Vice-Pres.  
Crocker, Douglas, Vice-Pres. and Sec.  
Cronell, John E., Jr., Vice-Pres.  
Cronin, Ambrose, Jr., Sec.  
Crooker, E. L., Vice-Pres.  
Crossett, E. C., Pres.  
Crowther, C. R., Vice-Pres.  
Croy, Leo E., Vice-Pres.  
Crump, J. G., Treas.  
Crump, R. S., Pres.  
Cullen, R. J., Pres.  
Cuneo, Newton, Treas.  
Curtenius, A. E., Pres.  
Curtenius, D. R., Pres.  
Cushman, Henry O., Pres.  
Cushman, James M., Vice-Pres.  
Custer, M. D., Sec.-Treas.



## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

### D

Dahlberg, B. G., Chairman, Pres.  
Daniel, Charles E., Sec.-Treas.  
Daniels, A. Millard, Pres. and Sec.  
Daniels, H. S., Vice-Pres.  
Daniels, Rupert B., Treas.  
Darling, Kent C., Vice-Pres. and Treas.  
Daum, Charles, Pres. and Treas.  
Daum, Wm., Vice-Pres. and Sec.  
Davenport, F. E., Vice-Pres.  
Daverin, W. E., Sec.  
Davey, Wm. O., Vice-Pres. and Treas.  
Davis, F. E., Sec.-Treas.  
Davis, H. W., Vice-Pres.  
Davis, M. J., Pres.  
Davis, N. F., Sec.  
Davis, Robert T., Vice-Pres.  
Davis, T. K., Sec.  
Dawson, W. C., Treas.  
Dawson, W. L., Pres.  
Day, Margaret H., Treas.  
Deacon, E. L., Sec.  
DeCew, J. A., Pres. and Treas.  
Dee, Thomas J., Vice-Pres.  
Deffenbaugh, J. W., Vice-Pres.  
De Guerre, L. A., Vice-Pres., Pres.  
Dejonge, Louis, Vice-Pres., Sec.-Treas.  
De Mase, O., Vice-Pres.  
Dempsey, E. J., Vice-Pres.  
Dempsey, Edw. J., Sec.  
Demsey, R. H., Vice-Pres.  
Denison, A. C., Owner  
Denman, D. S., Vice-Pres.  
Dennison, C. C., Vice-Pres.  
Denton, R. C., Vice-Pres.  
Dern, John, Chairman of Board  
De Roberts, R., Sec.  
Desiderio, Anthony, Pres.  
Desiderio, Dominick, Vice-Pres.  
Desiderio, Thomas, Sec.-Treas.  
Dettman, E. A., Sec.  
Deupree, R. R., Pres.  
Dice, Mrs. Mary Little, Vice-Pres.  
Dickey, U. M., Pres.  
Dickinson, F. M., Vice-Pres.  
Dickinson, F. P., Sec.  
Dickinson, K. S., Pres. Treas.  
Dickinson, P. S., Vice-Pres.  
Dickinson, Phil S., Sec.  
Dillingham, W. F., Pres.  
Dix, H. P., 2nd Vice-Pres.  
Dixon, W. J., Vice-Pres. Sec.  
Dixon, W. K., Sec.  
Dixon, W. M., Vice-Pres.  
Dodd, Allison, Chairman of Board

Dodd, E. Davey, Vice-Pres. and Sec.  
Dodd, John A., Pres.  
Dole, C. T., Pres.  
Dole, W. T., Vice-Pres. and Sec.-Treas.  
Donahoe, C. J., Sec.-Treas.  
Donald, H. S., Sec.-Treas.  
Donaldson, E. Victor, Pres.  
Donohue, John W., Treas.  
Dorsey, C. C., Vice-Pres.  
Dow, Eugene, Pres.  
Dowd, H. J., Vice-Pres.  
Dunlap, C. K., Sec.  
Dunn, George C., Sec.-Treas.  
Dunn, Theo. W., Pres.  
Dunnington, C. W., Sec.-Treas.  
Dupont, E. P., Sec.-Treas.  
Durand, G. F., Sec.  
Dyke, George E., Pres.

### E

Earhart, E. E., Vice-Pres.  
Eckhardt, L. C., Sec.-Treas.  
Edson, R. B., Sec.  
Edwards, C. B., Sec.  
Edwards, C. P., Sec.  
Edwards, G. H., Pres.  
Edwards, H. A., Treas.  
Edwards, W. T., Vice-Pres.  
Eisenberg, I., Pres.  
Eisner, S. J., Sec.-Treas.  
Eisner, Wm. J., Pres.  
Ekberg, J. P., Vice-Pres.  
Ellerson, H. W., Pres., Vice-Pres.  
Elliott, George, Treas.  
Ellis, Robert H., Vice-Pres.  
Ellis, R. W., Sec.  
Ellis, Zenith, Vice-Pres. and Treas.  
Emerson, Albert L., Pres.  
Emerson, Lowell, Pres.  
Emerson, R. G., Sec.  
Emery, E. Fred., Vice-Pres.  
Enders, Fred., Vice-Pres.  
Englander, Joseph, Pres. and Treas.  
Esleeck, I. N., Pres.  
Evans, Lyle S., Sec.  
Everest, D. C., Sec.-Treas., Pres., Vice-Pres. and Treas.  
Ewer, F. M., Treas.  
Ewing, Clayton, Pres.  
Ewing, R. D. W., Vice-Pres.  
Eyster, J. A., Sec.

### F

Fager, Charles, Pres.  
Fager, Robert, Vice-Pres.

Fair, H. H., Chairman of Board  
Fairbanks, Wm., C., Sec.  
Fairburn, R. G., Vice-Pres.  
Fairburn, William A., Vice-Pres.  
Falconer, J., Treas.  
Fannin, Geo. M., Vice-Pres. and Sec.  
Farina, E. J., Vice-Pres.  
Farley, Roy J., Vice-Pres.  
Farwell, R. E., Treas.  
Faulkner, P. H., Pres.  
Faxon, H. P., Pres. and Treas.  
Fearing, J. L., Vice-Pres.  
Feinberg, A. W., Sec.  
Feinberg, B. R., Pres.  
Fell, L., Vice-Pres.  
Fellows, L. F., Treas.  
Feltenstein, M. E., Sec.-Treas.  
Ferguson, Geo., K., Pres.  
Ferguson, R. K., Pres.  
Ferguson, S., Vice-Pres.  
Ferguson, Sydney, Pres., Vice-Pres.  
Fernald, T. W., Vice-Pres.  
Fernstrom, Erik, Chairman of Board  
Fernstrom, F. O., Pres.  
Fieweger, R. J., Treas.  
Fincken, Julius A., Vice-Pres.  
Finder, Herman J., Pres.  
Finder, Jerome M., Sec.  
Finder, M. W., Treas.  
Finger, S. B., Sec.-Treas.  
Fink, Esther, Sec.-Treas.  
Finlay, B. E., Pres.  
Finlay, L. G., Vice-Pres.  
Finley, C. E., Vice-Pres.  
Fischer, F. C., Sec.  
Fishburn, Victor E., Vice-Pres.  
Fisher, H. D., Sec. and Treas.  
Fisher, J. A., Pres. and Treas.  
Fisher, Ralph M., Vice-Pres.  
Fisher, W. A., Vice-Pres.  
Fitts, R. L., Vice-Pres. and Treas.  
Fitzgerald, Matthew J., Sec.-Treas.  
Fitzgerald, William O., Treas.  
Flaherty, Martin J., Pres.  
Flanagan, John J., Vice-Pres. and Treas.  
Fleming, A. S., Vice-Pres. and Treas.  
Fleming, E. T., Jr., Vice-Pres.  
Fleming, E. T., Sr., Pres.  
Fleming, J. B., Sec.-Treas.  
Fleming, John G., Vice-Pres.  
Fletcher, J. S., Sec.  
Flint, N. C., Vice-Pres.  
Flockhart, Thomas A., Vice-Pres.  
Flood, E. E., Sec.

## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

Flood, Jno. J., Vice-Pres.  
Floyd, R. C., Vice-Pres.  
Flynn, Della, Sec.-Treas.  
Fonda, Fred C., Sec.  
Forbes, E. A., Vice-Pres.  
Ford, Edsel, Pres. and Treas.  
Forkin, E. W., Sec.-Treas.  
Forman, C. M., Sec. and Treas.  
Forsyth, Wilfred L., Pres.  
Fortune, Samuel J., Vice-Pres.  
Foster, T. Stewart, Pres.  
Foulds, William, Treas. Pres.  
Foulds, William, Jr., Pres. Vice-Pres.  
Fowler, George B., Vice-Pres. and Treas.  
Fowler, Norman N., Pres.  
Fowler, R. N., Vice-Pres. and Treas.  
Fowler, William S., Sec.  
Fox, John C., Pres.  
Fox, O. A., Vice-Pres. and Treas.  
Frampton, Frank D., Vice-Pres.  
Francis, G. S., Sec.  
Freas, A. G., Vice-Pres.  
Freedman, Al H., Sec.-Treas.  
Freedman, Peter, Sec.  
Freeman, Eben W., Sec.  
French, E. S., Sec.  
French, F. G., Pres.  
Friedlander, Frank V., Pres.  
Friedlander, Victor, Sec.-Treas.  
Friend, J. H., Vice-Pres.  
Fritz, Charles B., Pres.  
Fritz, Geo. T., Sec.-Treas.  
Frobisher, R. S., Pres.  
Frohman, Sidney, Pres.  
Fry, Eugene W., Pres. and Treas.  
Fry, H. M., Sec.-Treas.  
Fry, Lloyd A., Pres.  
Fry, S. R., Pres.  
Fuller, C., Vice-Pres.  
Funke, C. J., Vice-Pres.  
Funke, Ferdinand A., Pres.  
Funke, Joseph H., Sec.-Treas.

### G

Gabrielson, Guy George, Pres.  
Gaetske, M. J., Sec.  
Gallagher, F. E., Vice-Pres.  
Gallagher, L. P., Pres.  
Gallagher, W. E., Vice-Pres. and Treas.  
Galloway, Mrs. Gertrude Hagar, Vice-Pres.  
Gamble, John T., Vice-Pres.  
Gamble, W. S., Pres. and Treas.  
Garber, L. F., Treas.  
Gardner, Chas. H., Sec.-Treas.  
Gardner, Chas. H., Treas.

Gardner, Colin, Vice-Pres.  
Gardner, E. T., Pres.  
Garfield, H. S., Treas.  
Garroch, M. C., Sec.  
Garstrang, Guy A., Sec.  
Gartland, I. L., Vice-Pres.  
Gartman, Edna W., Sec.  
Gartman, George E., Pres. and Treas.  
Garver, Ivan E., Pres.  
Garver, Russell B., Vice-Pres.  
Garvin, J. F., Treas.  
Gatch, P. M., Vice-Pres.  
Gates, B. W., Pres.  
Gates, R., Treas.  
Gay, E. R., Vice-Pres.  
Gaylord, C. W., Pres.  
Gayner, E. J., III, Vice-Pres.  
Geddes, L. A., Sec.  
Geddes, W. L., Pres.  
Geer, William C., Pres.  
Genuit, J. W., Vice-Pres.  
George, T. H., Treas.  
Gerpeide, G. H., Pres.  
Gevaert, Dr. J., Pres.  
Gianninni, Joseph, Vice-Pres.  
Gibson, C. C., Treas.  
Gibson, Wm. S., Pres.  
Gideon, P. H., Treas.  
Gieger, J. M., Sec.  
Giessel, L. A., Treas.  
Gilbert, A. C., Pres.  
Gilbert, G. M., Vice-Pres.  
Gilbert, J. B., Treas.  
Gilbert, T. M., Sec.-Treas.  
Gilman, Chas., Vice-Pres., Pres.  
Gilman, Francis D., Sec.-Treas.  
Gilman, Francis D., Jr., Pres.  
Gilman, Isaac, Pres., Chairman of Board  
Gilman, K., Pres.  
Gilman, Mary, Treas.  
Gilman, Michael, Pres.  
Gilman, S., Vice-Pres.  
Gilmore, Robert, Vice-Pres.  
Ginsberg, Harry, Treas.  
Gintzler, M., Sec.  
Give, Henry de, Sec.  
Glasgow, C. L., Vice-Pres. and Treas.  
Glatfelter, P. H., Pres. and Treas.  
Gleason, Daniel J., Pres.  
Godhelp, J. C., Vice-Pres.  
Goeltz, Lindsay, Sec.  
Goessling, Val. J., Pres.  
Goldsmith, Alan G., Treas., Vice-Pres.  
Goldsmith, D. J., Sec.  
Goldstein, M. F., Sec.

### H

Hair, Clarence, Sec.  
Hakes, F. W., Pres.  
Hall, M. B., Pres.  
Hallagan, Stuart D., Treas.  
Hallowell, J. J., Vice-Pres. and Sec.  
Hallowell, R. M., Pres.  
Hamburger, Eugene, Sec.  
Hammersley, A. G., Vice-Pres. and Treas.  
Hamilton, Walker, Vice-Pres.  
Hann, Vincent R., Pres., Treas.  
Hanrahan, J. A., Sec.  
Hansen, A. B., Exec. Vice-Pres.  
Hanson, H. H., Pres.  
Harbrecht, J. W., Vice-Pres.  
Harrigan, R. T., Pres.  
Harris, W. B., Vice-Pres. and Treas.  
Harrison, A. McL., Pres.



## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

Harrison, H. H., Vice-Pres.  
Harrison, M., Vice-Pres.  
Hartley, M. T., Vice-Pres.  
Hartman, D. L., Vice-Pres.  
Hartman, R. E., Pres.  
Hartwell, Frank O., Exec. Vice-Pres.  
Hartwell, R. L., Sec.  
Harvey, Harold C., Pres. and Treas.  
Harvey, I. J., Jr., Pres.  
Haslanger, H. L., Vice-Pres.  
Hauptli, H. A., Pres.  
Havens, R. B., Treas.  
Hawkes, A. W., Pres. and Chairman  
Hawkins, Geo. W., Vice-Pres.  
Hayes, J. V. J., Sec.  
Haynes, E. A., Vice-Pres.  
Hays, C. B., Vice-Pres.  
Hayward, R. A., Pres.  
Haywood, Francis, Treas.  
Hazen, E. E., Pres.  
Hecksher, August, Chairman  
Hedstrom, Olaf, Sr., Pres.  
Heinrich, John A., Sec.-Treas.  
Heinritz, F. C., Sec.  
Heit, N. E., Pres.  
Henry, W. J., Vice-Pres.  
Heppes, G. P., Vice-Pres.  
Herb, J. J., Pres.  
Herb, P. J., Vice-Pres.  
Herman, Abraham, Sec.  
Herz, Sol., Vice-Pres.  
Hesse, C. G., Vice-Pres.  
Heywood, F. C., Treas.  
Hilfert, E. C., Sec.-Treas.  
Hill, C. Dewey, Sec.  
Hill, Irving, Pres.  
Hillard, R. H., Vice-Pres.  
Hilton, George, Sec.  
Hilton, Wm., Vice Pres.  
Hinds, A. K., Vice-Pres.  
Hinkley, Philip E., Sec.  
Hinkson, J. R., Pres. and Treas.  
Hinman, J. H., Vice-Pres.  
Hinman, Russell W., Sec., Treas.  
Hirschey, U. C., Pres. and Treas.  
Hoague, H. M., Pres.  
Hobbs, V. C., Sec.  
Hobson, Arthur L., Pres.  
Hobson, John L., Vice-Pres. and Treas.  
Hodgdon, Paul E., Exec. Vice-Pres.  
Hodgdon, P. W., Pres. and Treas.  
Hoepfer, C. W., Vice-Pres.  
Hoff, L. R., Vice-Pres.  
Hoffman, H. H., Vice-Pres., Treas., Sec.

Hohle, K. O., Pres.  
Holden, G. M., Vice-Pres.  
Hollingsworth, Amor, Pres.  
Hollingsworth, Phena, Vice-Pres. and Treas.  
Hollingsworth, Valentine, Pres.  
Hollis, Howard, Vice-Pres. and Sec.  
Hollister, Dwight G. W., Pres.  
Holmes, J. E., Pres. and Treas.  
Hoopes, Maurice, Pres.  
Hoombeek, Arthur V., Partner  
Hoombeek, Louis A., Partner  
Hopper, B. C., Pres.  
Hormuth, G. Molitor, Vice-Pres.  
Horr, R. G., Vice-Pres.  
Hoskin, R. A., Vice-Pres.  
Hoskin, R. W. S., Pres.  
Housen, Morris, Vice-Pres.  
Houston, Grafton, Vice-Pres. and Sec.  
Houston, P. L., Vice-Pres.  
Hovey, Rex W., Vice-Pres.  
Howard, Harry C., Vice-Pres.  
Howard, H. M., Pres.  
Howard, L. S., Treas.  
Howard, Maxwell, Pres.  
Howard, Ward R., Vice-Pres. and Sec.  
Howarth, C. W., Sec.  
Howe, A. M., Vice-Pres.  
Howell, E. W., Sec.  
Howell, W. F., Sec.  
Howell, Wilbur F., Sec.  
Howes, H. C., Sec.-Treas.  
Howland, Arthur V., Vice-Pres. and Sec.  
Howland, Frank C., Treas.  
Howland, Geo. S., Sec.  
Hughes, V. A., Sec.  
Hulbert, L., Treas.  
Hummel, J. P., Chairman of Board  
Hunt, J. F., Sec.  
Hunt, L. M., Vice-Pres.  
Hurlbut, W. N., Vice-Pres.  
Hurwich, Samuel R., Vice-Pres.  
Hutchison, J. K., Vice-Pres.  
Huysoon, Vice-Pres.  
Hyatt, L. N., Vice-Pres.  
Hyde, John E., Vice-Pres.

### I

Ignatius, W. C., Sec.-Treas.  
Ijams, F. B., Pres.  
Ingram, Verner, Sec.  
Ireland, W. W., Sec.  
Irvine, H. H., Treas., Vice-Pres.  
Irving, C. C., Vice-Pres.

### J

Jack, J. M., Vice-Pres.  
Jackson, H. C., Sec.  
Jacobs, Clifton N., Vice-Pres.  
Jaite, Robert G., Vice-Pres.  
Jaite, Russell, Pres.  
Jameson, Chas. F., Treas.  
Jasperson, C. A., Sec.-Treas.  
Jefferis, R. E., Sec.-Treas.  
Jeffords, Frank W., Pres.  
Jenkins, Geo. O., Jr., Vice-Pres.  
Jenkins, H. Loring, Treas.  
Jenkins, Robert A., Pres.  
Jennings, E. H., Vice-Pres. and Sec.  
Johnson, Chas. F., Jr., Vice-Pres.  
Johnson, D. C.  
Johnson, George F., Chairman  
Johnson, Geo. W., Pres.  
Johnson, H. C., Vice-Pres.  
Johnson, Harry T., Vice-Pres.  
Johnson, J. S., Vice-Pres.  
Johnson, R. C., Vice-Pres.  
Johnson, R. W., Chairman of Board  
Johnson, T. O., Pres.  
Johnston, E. B., Vice-Pres.  
Johnston, Helen E., Part Owner  
Johnston, John E., Part Owner  
Johnston, J. K., Vice-Pres.  
Johnston, M. S., Treas.  
Johnston, R. C., Treas.  
Johnston, Ruth M., Part Owner  
Jones, A. S., Treas.  
Jones, C. M., Sec.  
Jones, H. H., Chairman  
Jones, J., McHenry, Sec.  
Jones, T. A. D., Vice-Pres.  
Jones, T. E., Pres.  
Jones, Walter D., Treas.  
Jordan, A. H. B., Pres. and Treas.  
Jubb, G. T., Sec.  
Junod, Ray L., Vice-Pres.

### K

Kaiser, C. Julian, Vice-Pres. and Sec.  
Kanzler, George, Pres.  
Kaufmann, Dr. B., Chairman  
Kaufmann, Dr. Werner, 1st Vice-Pres.  
Kazmierczak, Wojciech, Pres.  
Keady, W. L., Vice-Pres.  
Keesey, Horace, Sec.  
Kehew, C. T., Sec.  
Kehew, H. T., Treas.

## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

Keller, I. C., Vice-Pres.  
Keller, Ralph E., Vice-Pres.  
Kelley, H. F., Treas.  
Kelley, M. B., Pres.  
Kelley, William P., Pres. and Treas.  
Kelly, John E., Pres.  
Kemps, A., Vice-Pres.  
Kendler, E. A., Sec.  
Kendler, Ernest A., Sec.-Treas.  
Kerr, Edward, Vice-Pres.  
Kerr, Peter, Pres.  
Ketchum, Henry G., Vice-Pres. and Sec.  
Ketchum, Mrs. Rosalie S., Pres.  
Kettra, W. H., Treas.  
Key, J. Frank, Sec.  
Kieckhefer, H. M., Sec.-Treas.  
Kieckhefer, J. W., Pres. and Vice-Pres.  
Kieckhefer, W. F., Sec.-Treas.  
Kiefer, E. W., Pres.  
Kiefer, F., Vice-Pres.  
Kieffer, J. E., Treas.  
Killmer, Ogden, Sec.  
Kimberly, J. C., Pres.  
Kimburly, Geo. M., Vice-Pres.  
Kindleberger, J., Chairman  
King John F., Sec.-Treas.  
King, H. R., Pres.  
Kingsley, A. D., Pres.  
Kipnis, Samuel, Pres.  
Kirsch, Alfred J., Vice-Pres. and Sec.  
Kirschbraun, Lester, Vice-Pres.  
Klefeker, Chas. B., Vice-Pres.  
Kleinstuck, C. H., Vice-Pres.  
Kling, Walter L., Vice-Pres. and Sec.  
Klugman, B., Sec.-Treas.  
Knapp, Harold, Vice-Pres.  
Knauer, R. F., Sec.-Treas.  
Knode, O. M., Pres.  
Knode, S. C., Vice-Pres.  
Knott, Harold R., Vice-Pres.  
Knowles, John A., Vice-Pres.  
Knowlton, G. S., Chairman of Board  
Knowlton, T. E., Pres.  
Koester, F. P., Pres. and Treas.  
Koons, J. A., Owner  
Koons, L. R., Owner  
Koplin, L. C., Vice-Pres.  
Koster, H. F., Sec.-Treas.  
Kretchman, L. F., Sec.  
Kreutzer, A. L., Pres. and Treas.  
Krohn, Joseph J., Sec.-Treas.  
Kuhns, H. B., Vice-Pres.

Kupfer, Louis, Pres.  
Kurth, Ernest L., Pres.

### L

Lake, J. W., Vice-Pres.  
Landeck, Walter V., Vice-Pres.  
Landis, R. K., Sec.  
Langtry, W. W., Vice-Pres.  
Lannan, E. P., Sec.-Treas.  
Larkin, E. H., Vice-Pres.  
Larsen, V. H., Vice-Pres.  
LaRue, W. S., Vice-Pres.  
Lavner, H. J., Vice-Pres.  
Lawless, C. H., Sec.  
Lawless, David F., Pres., Treas.  
Lawless, F. J., Treas.  
Lawless, M. J., Treas., Pres., Vice-Pres.  
Lawless, M. J., Vice-Pres.  
Lawless, T. E., Pres.  
Lawrence, Carl A., Vice-Pres.  
Lawrence, M. Anne, Sec.  
Lawrence, W. J., Bryant Paper Co., Pres.  
Leadbetter, F. W., Pres.  
Leadbetter, Pittock, Sec.  
Leathers, Don B., Treas.  
Lebold, F. M., Pres.  
Lebold, S. N., Sec.  
Ledeboer, John W., Vice-Pres.  
Lehon, Tom, Vice-Pres.  
Lennox, Robert W., Treas.  
Leonard, A. G., Pres.  
Leonard, A. G., Jr., Sec.  
Leonard, E. A., Treas.  
Leonhard, E. R., Vice Pres.  
Leonhard, W. C., 1st Vice-Pres.  
Leroy, J. A., Vice-Pres.  
Leslie, D. S., 1st Vice-Pres.  
Levine, Arthur, Vice-Pres.  
Levis, Charles M., Pres.  
Levis, Joseph J., Vice-Pres.  
Levisohn, Samuel, Vice-Pres. and Treas.  
Lewis, H. S., Pres.  
Lewis, Wm. G., Jr., Copartner.  
Liebman, Charles R., Treas.  
Light, C. K., Pres.  
Light, S. R., Vice-Pres.  
Liginger, J. W. D., Sec.-Treas.  
Limbeck, George, Vice-Pres.  
Lingenfelter, J. H., Sec.-Treas.  
Lipa, L. M., Sec.-Treas.  
Litz, J. L., Sec.-Treas.  
Livingston, Fred A., Pres.  
Livingston, Warner C., Sec.  
Lockett, Charles L., Jr., Vice-Pres.  
Lockwood, Albert, Treas.

Loewin, Arthur, Sec.  
Logan, G. Stanley, Treas.  
Logan, James N., Vice-Pres.  
Logan, John, Pres.  
Logan, John, Jr., 2nd Vice-Pres.  
Long, Godfrey B., 1st Vice-Pres.  
Long, L. J., Exec. Vice-Pres.  
Lopin, Sam, Vice-Pres. and Sec.  
Loring, Albert S., Vice-Pres.  
Lothrop, Francis B., Pres.  
Love, E. M., Pres.  
Lowe, Donald V., Vice-Pres.  
Lowe, Erving F., Pres.  
Lowe, Joseph A., Sec.-Treas.  
Lowe, Malcolm B., Sec.-Treas.  
Lowe, M. V., Pres.  
Lowe, Walter A., Vice-Pres.  
Lowe, W. H., Pres.  
Lowenstein, A. B., Vice-Pres.  
Luke, Adam K., Vice-Pres. and Treas.  
Luke, David L., Jr., Vice-Pres.  
Luke, Thomas, Pres.  
Lupton, E. H., Pres. and Treas.  
Lyll, L. B., Sec.-Treas.  
Lydall, E. A., Sec.-Treas.  
Lynch, M. T., Vice-Pres.  
Lynch, Walton D., Vice-Pres.  
Lysle, M. R., Sec.-Treas.

### M

McAdoo, Henry W., Vice-Pres.  
McBride, K. R., Pres.  
McCabe, T. B., Pres.  
McClellan, W. S., Vice-Pres.  
McCloskey, L. T., Vice-Pres.  
McColloch, Frank C., Sec.  
McConnell, A. R., Vice-Pres.  
McCormick, J. C., Sec.-Treas.  
McCulfor, Roy V., Treas.  
McCoullough, Mat, Treas.  
McCush, Wm., Treas.  
McDaniel, H. C., Vice-Pres. and Sec.  
McDevitt, Leo R., Vice-Pres. and Sec.  
McDonald, Miss H., Treas.  
McDonald, James, Vice-Pres.  
McDonald, M. C., Vice-Pres.  
McDonald, R. A., Exec. Vice-Pres.  
McDowell, J. Norman, Treas.  
McElwain, R. F., Vice-Pres.  
McEwan, Arthur, Pres.  
McEwan, Fred, Pres. and Treas.  
McEwan, N., Grace, Sec.  
McEwan, M. B., Sec.



## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

McEwan, R. W., Jr., Pres., Treas.  
 McGilla, Adele T., Vice-Pres.  
 McGinley, F. J., Pres.  
 McLravy, W. N., Chairman, Barrett Co.  
 McIlvain, F. Huston, Vice-Pres.  
 McIlvain, J. Gibson, Pres.  
 McIntyre, E. F., Vice-Pres.  
 McIntyre, W. E., Pres. and Treas.  
 McIver, R. S., Treas.  
 McKay, Wm. O., Vice-Pres.  
 McKee, E. L., Vice-Pres.  
 McKeon, Mrs. Fannie F., Pres.  
 McLaren, F., Vice-Pres. and Treas.  
 McMahon, K., Sec.-Treas.  
 McMillen, C. R., Vice-Pres.  
 McNally, Frank E., Chairman of Board  
 McVicker, Hector, Pres.  
 Mabee, D. W., Sec.  
 Macy, Frederick E., Pres.  
 Madden, M. L., Pres.  
 Madden, Russell S., 1st Vice-Pres.  
 Magnus, Carl, Vice-Pres.  
 Mahart, A. H., Treas.  
 Maher, C. G., Vice-Pres.  
 Mahler, Ernst, Exec. Vice-Pres., Pres.  
 Main, F. W., Vice-Pres.  
 Main, Roger L., Treas.  
 Maltby, R. B., Vice-Pres.  
 Manton, David M., Sec.  
 Mansell, O. S., Vice-Pres.  
 Marcuse, I. J., Vice-Pres. and Sec.  
 Marcuse, James E., Vice-Pres.  
 Marcuse, John A., Vice-Pres.  
 Marcuse, M. E., Pres., Vice-Pres.  
 Marcuse, Moses M., Treas.  
 Margeson, D. H., Treas.  
 Marion, Clarke, Vice-Pres.  
 Marquand, E. U., Vice-Pres.  
 Marshall, J. W., Pres.  
 Marshall, T. C., Treas.  
 Marshall, W. C., Partner  
 Marston, W. B., Treas.  
 Martin, A. B., Exec. Vice-Pres.  
 Martin, A. H., Treas.  
 Martin, C. B., Vice-Pres.  
 Martin, M. J., Pres.  
 Mason, Mrs. Herbert Warren, Sec.-Treas.  
 Mason, J. O., Vice-Pres.  
 Mason, Wm. H., Vice-Pres.  
 Massey, Peter J., Vice-Pres.  
 Massie, J. P., Vice-Pres.  
 Mateer, R. C., Vice-Pres.  
 Mather, S. L., Vice-Pres.  
 Matthew, Harry E., Pres.  
 Maull, William R., Vice-Pres.  
 Maurer, J. E., Vice-Pres. and Treas.  
 Maurer, L. J., Vice-Pres.  
 Maxcy, E. H., Sec.  
 May, F. E., Vice-Pres.  
 Maybee, G. W., Pres. and Treas.  
 Maynard, Nelson, Vice-Pres.  
 Mazer, A., Pres. and Treas.  
 Mazer, Abraham, Pres.  
 Mazer, Jacob, Pres., Treas.  
 Mazer, Joseph M., Treas., Sec.  
 Mazer, William, Vice-Pres.  
 Mead, Geo. H., Pres., Chairman  
 Mead, George W., Pres.  
 Mead, Henry S., Pres. and Treas.  
 Mead, Stanton W., Vice-Pres. and Treas.  
 Mead, W. L., Vice-Pres.  
 Medoff, William, Pres.  
 Megargee, G., Sec.  
 Megargee, Irwin F., Vice-Pres.  
 Meier, Hugo, Sec.  
 Merle, Lawrence, Vice-Pres.  
 Merlin, W. B., Vice-Pres.  
 Metz, Conrad, Vice-Pres.  
 Metz, Rudolph J., Treas.  
 Metz, Werner P., Pres.  
 Meunier, L. J., Vice-Pres.  
 Meyer, E., Treas.  
 Meyer, Ely, Pres. and Treas.  
 Meyer, P. A., Treas.  
 Michaelson, H. A., Sec.  
 Michaelson, H. Leonard, Pres.  
 Mildren, Brig. Gen., W. F., Pres.  
 Milham, A. B., Sec.  
 Milkey, L. E., Pres.  
 Miller, A. H., Exec. Vice-Pres.  
 Miller, A. W., Vice-Pres.  
 Miller, Charles A., owner  
 Miller, E. H., Sec.  
 Miller, F. A., Pres.  
 Miller, J. H., Vice-Pres.  
 Miller, John R., Vice-Pres.  
 Miller, Jos. S., Vice-Pres.  
 Miller, W. W., Vice-Pres.  
 Mills, Edward M., Pres.  
 Milner, C. E., Sec.-Treas.  
 Minsky, S. V., Pres.  
 Mister, B. G., Sec.-Treas.  
 Mitchell, A. P., Sec.  
 Mitchell, E. A., Sec.-Treas.  
 Mitchell, F. B., Pres.  
 Mitchell, M. B., Pres.  
 Moeller, W. J., Vice-Pres.  
 Mohan, Wm. F., 1st Vice-Pres.  
 Monroe, S. B., Sec., Treas.  
 Moon, Julia, A., Treas.  
 Moore, Paul F., Pres.  
 Moore, R. A., Vice-Pres.  
 Morgan, C. B., Vice-Pres.  
 Morian, C. H., Pres.  
 Morr, A. J., Treas.  
 Morrill, P. E., Sec.  
 Morrill, R. H., Vice-Pres.  
 Morse, G. Stanley, Pres.  
 Mory, Milsom B., Vice-Pres.  
 Moses, H. A., Pres.  
 Moyer, O. E., Vice-Pres.  
 Muehlberg, W. T., Vice-Pres.  
 Muehleck, E., Pres.  
 Muench, C. G., Vice-Pres.  
 Muessman, Vincent, Prop.  
 Mullin, J. L., Vice-Pres.  
 Munger, C. S., Vice-Pres.  
 Munger, R. P., Pres., Treas., Vice-Pres.  
 Munro, W. A., Pres.  
 Munson, W. D., Vice-Pres.  
 Murphy, Frank, Vice-Pres.  
 Murphy, T. F., Pres.  
 Murray, Earle, Pres.  
 Musser, R. D., Treas.  
 Naber, C. F., Pres.  
 Nachlup, Gustav, Pres.  
 Neher, F. H., Vice-Pres.  
 Nelson, B. F. II, Pres.  
 Nelson, C. E., Pres.  
 Nelson, P. P., Vice-Pres. and Treas.  
 Nelson, Robert F., Vice-Pres.  
 Newcombe, Albert, Treas.  
 Newcomber, S. J., Vice-Pres.  
 Newman, David, Pres.  
 Newman, Esther, Sec.-Treas.  
 Newman, N. E., Pres.  
 Newton, Arthur L., Sec.  
 Newton, Herbert B., Pres. and Treas.  
 Nichols, D. P., Sec.  
 Nichols, H. W., Pres.  
 Nicolson, G. L., Pres.  
 Nicolson, L. D., Sec.-Treas.  
 Nold, J. H., Vice-Pres.  
 Norton, E. H., Pres.  
 Norton, J. Albert, Vice-Pres.

## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

Norton, N. T., Treas.  
 Norton, S. C., Sec.-Treas.  
 Norton, W. J., Treas.  
 Nunez, Vasco E., Vice-Pres.  
 O  
 Oberdorfer, Max, Pres.  
 Obermanns, H. F., Vice-Pres.  
 Oberne, John E., Pres. and Treas.  
 Oberweiser, D. E., Vice-Pres.  
 Oberweiser, E. A., Pres.  
 O'Brien, E., Vice-Pres.  
 O'Connell, W. G., Treas.  
 O'Connor, George E., Pres.  
 O'Connor, J. J., Vice-Pres.  
 Oermann, Carl H., Pres.  
 Ohea, R. H., Sec.  
 Oliver, H. S., Treas.  
 Olmsted, George, Jr., Vice-Pres.  
 Olsson, Elis, Pres., Vice-Pres.  
 Olwell, Lee E., Pres.  
 O'Malley, Michael J., Pres.  
 O'Neal, C. B., Treas.  
 Osborne, W. Irving, Jr., Pres.  
 Osmund, T., Sec., Tumwater Paper Mills Co.  
 Ostrander, George N., Vice-Pres. and Sec.  
 Otto, G. G., Vice-Pres. and Gen. Mgr.  
 Overmiller, J. C., Sec.  
 Outerbridge, Basil, Pres., Sec.  
 Outerbridge, Herbert A., Vice-Pres.  
 Oxenham, W. T., Sec.  
 Ozurovich, John, Pres. and Treas.  
 P  
 Pace, A. D., Vice-Pres. and Treas.  
 Pace, J. C., Vice-Pres.  
 Paddock, H. Lester, Pres.  
 Paepcke, Walter P., Pres.  
 Page, Robert L., Sec. and Treas.  
 Paine, A. G., Chairman of the Board  
 Paine, Charles G., Vice-Pres.  
 Paine, Eustis, Pres.  
 Paine, Peter, 1st Vice-Pres.  
 Palamontain, P. R., Treas.  
 Palmer, Edward, Pres.  
 Palmer, E. M., Vice-Pres.  
 Parant, L. J., Vice-Pres.  
 Park, M. A., Vice-Pres.  
 Parker, C. G., Vice-Pres.  
 Parker, H. O., Vice-Pres. and Treas.  
 Parrish, J. Scott, Treas.  
 Parsons, M. F., Vice-Pres.  
 Pasco, Franklin E., Sec.  
 Patten, Z. C., Vice-Pres.  
 Patterson, D. H., Jr., Pres.  
 Patton, E. W., Sec.-Treas.  
 Peabody, George R., Pres.  
 Peabody, L. C., Sec.-Treas.  
 Pearsall, J. H., Treas.  
 Pease, R. L., Vice-Pres.  
 Peavey, H. J., Sec.-Treas.  
 Peavey, W. M., Pres.  
 Peck, T. W., Sec.  
 Pelkey, H. H., Sec.  
 Penfield, A. R., Vice-Pres.  
 Penfield, W. E., Vice-Pres.  
 Penney, Charles P., Sec.  
 Pepper, G. Willing, Treas.  
 Perkins, Benjamin F., Pres.  
 Perkins, J. Lewis, Jr., Treas.  
 Perkit, Charles, Pres.  
 Perkit, Edward, Treas.  
 Perry, F. Gardiner, Sec.-Treas.  
 Perry, F. J., Pres.  
 Perry, Kenneth, Sec.  
 Peters, F. A., Sec.  
 Petty, Fred J., Sec.  
 Pfeiffer, W. F., Sec.-Treas.  
 Phelan, Sidney M., Vice-Pres.  
 Phillips, D. F., Sec.  
 Picola, Benjamin F., Vice-Pres.  
 Pierce, Arthur J., Pres.  
 Pierce, L. A., Vice-Pres.  
 Pierce, R. C., Sec.  
 Pike, Cecil M., Sec.  
 Pilcher, L. H., Vice-Pres.  
 Pilz, W. J., Vice-Pres. and Sec.  
 Plantier, Edward D., Vice-Pres.  
 Plum, E. Gaddis, Vice-Pres.  
 Plumstead, Joseph E., Sec.  
 Plunkett, A. T., Vice-Pres.  
 Pomeroy, A. D., Treas.  
 Pomeroy, Brenton C., Pres.  
 Porter, Andrew, Vice-Pres.  
 Porter, F. T., Vice-Pres.  
 Powers, P. A., Sec.  
 Powers, Ralph A., Pres.  
 Pratt, C. Walter, Vice-Pres.  
 Prentis, H. W., Jr., Pres.  
 Preston, H. R., Vice-Pres. and Sec.-Treas.  
 Preston, Marvin, Vice-Pres.  
 Preu, B. O., Vice-Pres.  
 Prince, F. M., Vice-Pres.  
 Prince, J. F., Treas.  
 Pritchard, Lysle E., Board of Directors  
 Puett, Ross, Pres.  
 Purinton, R. E., Sec.  
 Pyl, J. A., Vice-Pres.  
 Pyl, John, Sec.  
 Pyle, Horace A., Treas.  
 Q  
 Quirk, D. L., Jr., Pres.  
 R  
 Race, W. W., Sec.  
 Race, William, Sec.-Treas.  
 Ralph, S. H., Vice-Pres.  
 Ralston, R. M. Vice-Pres.  
 Ramage, James B., Vice-Pres.  
 Randall, H. T., Vice-Pres.  
 Randall, J. Edwin, Sec.  
 Rankin, W. P., Sec.-Treas.  
 Ransom, W. E., Exec. Vice-Pres.  
 Ratcliff, A., Pres.  
 Rathbun, O. N., Treas.  
 Rau, Irving T., Sec.-Treas.  
 Rauch, H. Lee, Pres.  
 Raymond, H. E., Pres.  
 Raymond, W. L., Vice-Pres.  
 Read, Gordon M., Pres. and Treas.  
 Read, Robert E., Pres.  
 Ready, C. M., Sec.  
 Redford, E. B., Sec.  
 Reed, J. D. N., Sec.-Treas.  
 Reed, P. L., Pres.  
 Reeves, C. H., Vice-Pres.  
 Reichert, F. G., Vice-Pres.  
 Reid, E. C., Vice-Pres.  
 Reid, H. E., Sec.  
 Reider, B. I., Vice-Pres.  
 Remington, John A., Sec.  
 Remsen, T. R., Vice-Pres.  
 Rice, Philip E., Treas.  
 Rich, Wm. T., Jr., Pres.  
 Richardson, J. M., Chairman of Board  
 Richardson, Paul, Sec.  
 Richardson, W. H., Vice-Pres.  
 Richmond, Geo. L., Pres.  
 Rickard, Edgar, Pres.  
 Riegel, B. D., Chairman of Board.  
 Riegel, John L., Pres.  
 Riendeau, A., Sec.-Treas.  
 Rieser, Norvin H., Pres.  
 Riis, Erling, Vice-Pres.  
 Robbins, Harry, Vice-Pres.





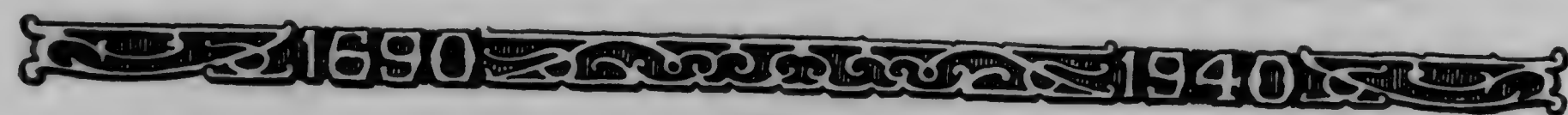
## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

Roberts, B. H., Pres.  
Roberts, C. H., Treas.  
Roberts, W. M., Sec.-Treas.  
Robertson, Geo., E., Vice-Pres.  
Robertson, H. J., Jr., Pres.  
Robertson, Reuben B., Exec. Vice-Pres.  
Robertson, Reuben B., Jr., Vice-Pres.  
Robertson, Robert H., Pres. and Treas.  
Robineau, S. P., Sec.  
Robinson, F. G., Vice-Pres.  
Rock, Roger J., Vice-Pres.  
Rogers, Dudley P., Pres.  
Rogers, Elliot, Pres.  
Rogers, F. S., Vice-Pres.  
Rogers, Henry G., Vice-Pres.  
Rogers, Leon B., Treas.  
Rogers, P. H., Vice-Pres.  
Rogerson, W. W., Treas.  
Rome, Doris R., Vice-Pres.  
Rome, Irwin H., Pres.  
Rome, Irwin W., Sec.  
Rose, Alice M., Sec.  
Rose, E. P., Pres. and Treas.  
Rosenfeld, Louis, Vice-Pres.  
Rosenfeld, M., Treas.  
Rosenthal, Dunbar A., Pres. and Treas.  
Rosenthal, Leroy A., Vice-Pres.  
Ross, D. L., Vice-Pres.  
Rowe, J. J., Vice-Pres.  
Rowe, P. C., Vice-Pres.  
Rhoads, Ralph E., Sec.  
Rhodes, C. G., Sec.  
Ruckert, H. E., Vice-Pres.  
Ruder, Geo. L., Vice-Pres.  
Rushton, H. J., Sec.  
Russell, H. M., Pres. and Treas.  
Russell, S., Vice-Pres.  
Ryland, J. F., Vice-Pres.  
Ryman, F. E., Treas.

**S**  
Sage, C. H., Vice-Pres.  
Sager, Carl E., Pres.  
Sager, Elizabeth N., Treas.  
St. Laurent, R. A., Vice-Pres.  
Sall, Samuel, Sec.  
Sanders, G. C., Vice-Pres.  
Sandroff, A. E., Pres.  
Sanger, J. P., Vice-Pres.  
Satink, Dorothy, Treas.  
Sawyer, C. J., Pres.  
Schacker, C. H., Sec.

Scheid, A. B., Treas.  
Schilling, P. A., Pres.  
Schlesinger, A. L., Pres.  
Schmidt, Carl R., Vice-Pres.  
Schmidt, Henry D., Pres. and Treas.  
Schmidt, Herman H., Treas.  
Schmidt, Richard, Pres.  
Schneller, F. J., 2nd Vice-Pres.  
Schnorbach, P. P., Pres.  
Schnorbach, P. W., Vice-Pres. and Treas.  
Schoener, Harry B., Treas.  
Schoning, Otto A., Vice-Pres.  
Schoo, C. J., Vice-Pres.  
Schorger, A. W., Pres.  
Schroeder, Arthur, Vice-Pres.  
Schuh, M. A., Vice-Pres.  
Schultz, Alwin A., Sec.-Treas.  
Schultz, V. S., Sec.  
Schwartz, J. H., Treas.  
Schweitzer, Louis, Pres.  
Schweitzer, William, Vice-Pres.  
Scott, J. S., Treas.  
Scott, W. C., Vice-Pres.  
Scott, William R., III, Sec.  
Seaborne, C. R., Vice-Pres. and Treas.  
Sebright, John C., Sec.  
Seeger, G. R., Vice-Pres.  
Sells, Geo. M., Treas.  
Sengle, Robert L., Vice-Pres. and Sec.  
Sensenbrenner, F. J., Pres.  
Sensenbrenner, J. S., Vice-Pres.  
Sensenbrenner, R. M., Vice-Pres.  
Senseney, George, Pres.  
Shafer, W. F., Jr., Sec.  
Shafer, W. F., Sr., Pres.  
Shaffer, Wm. R., Pres.  
Shainwald, R. H., Exec. Vice-Pres.  
Shainwald, R. S., Chairman  
Shapiro, J. J., Sec.  
Shapiro, J. M., Pres. and Treas.  
Shattuck, S. F., Vice-Pres.  
Shaver, C. H., Sec.-Treas.  
Shearer, Walter V., Vice-Pres.  
Sheedy, Michael, Sec.-Treas.  
Sheedy, Winthrop L., Pres.  
Sheehan, W. B., Vice-Pres. and Treas.  
Sheil, Joan E., Sec.  
Sherman, Elmer, Sec. and Treas.  
Sherman, Elmer A., Treas.  
Sherman, Raymond R., Pres.  
Shilling, H., Vice-Pres.

Shoemaker, W. M., Sec.  
Shortal, P. E., Treas.  
Shortess, W. G., Pres.  
Showalter, Arthur H., Vice-Pres.  
Shryock, O. A., Pres.  
Shryock, S. S., Jr., Sec.-Treas.  
Shuro, John M., Vice-Pres.  
Silk, Chas. R., Treas. Vice-Pres.  
Silk, F. B., Pres.  
Silk, F. F., Sec.  
Silk, J. A., Vice-Pres.  
Silverstein, S. M., Vice-Pres.  
Simeral, R. W., Vice-Pres.  
Simmonds, H. J., Vice-Pres.  
Simmons, C. A., Vice-Pres.  
Simon, Harry C., Pres.  
Simpson, I. M., Vice-Pres.  
Sinclair, F. D., Vice-Pres.  
Sinclair, G. R., Sec.-Treas.  
Sisson, Chas. H., Vice-Pres.  
Sisson, F. T. E., Sec.  
Sisson, Geo. W., Jr., Pres.  
Sisson, Walter C., Treas.  
Sitzer, E. A., Pres.  
Skinner, E. W., Vice-Pres.  
Slaughter, John A., Exec. Vice-Pres. and Treas.  
Sloan, Hugh W., Sec.-Treas.  
Slocum, C. H., Sec.  
Smead, J. W., Vice-Pres.  
Smeallie, J. Donald, Pres. and Sec.  
Smiley, M. D., Treas.  
Smith, Albert E., 1st Vice-Pres.  
Smith, A. F., Vice-Pres.  
Smith, Carlton R., Treas.  
Smith, C. V., Sec.  
Smith, C. W., Pres., Treas.  
Smith, C. Wylie, Vice-Pres.  
Smith, D. A., Vice-Pres.  
Smith, D. B., Sec.-Treas.  
Smith, Edward C., Sec.  
Smith, Franklin E., Treas.  
Smith, Fred L., Sec.  
Smith, H. A., Sec.  
Smith, J. E., Pres.  
Smith, J. E., Jr., Vice-Pres.  
Smith, John H., Pres.  
Smith, K. S., Pres.  
Smith, M. E.,  
Smith, M. N., Pres.  
Smith, Marshall, Vice-Pres.  
Smith, Mary A., Treas.  
Smith, Mowry, Treas.  
Smith, Murray, Sec.  
Smith, R. W., Vice-Pres.



## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

Smith, Ralph S., Sec.  
Smith, Roger D., Pres.  
Smith, Roger P., Sec.  
Smith, Thomas W., Sec.  
Snideman, R. L., Pres.  
Snow, Roger V., Sec.  
Snow, William B., Treas.  
Snyder, Gordon, Sec.-Treas.  
Snyder, J. Leslie, Vice-Pres.  
Southon, A., 1st Vice-Pres.  
Southworth, Constant, Vice-Pres.  
Southworth, Edward, Sec.-Treas.  
Southworth, Melvin D., Pres.  
Spachner, J. V., Vice-Pres.  
Spade, C. I., Vice-Pres.  
Spafford, H. H., Vice-Pres.  
Spaulding, H. N., Pres., Treas.  
Spaulding, R. H., Pres.  
Spencer, R. W., Pres. and Treas.  
Spiegel, E. J., Vice-Pres. and Treas.  
Sprague, W. S., Pres.  
Stagmater, John, Pres.  
Stagmater, Hubert J., Treas.  
Staley, Laurie, Sec.-Treas.  
Stansbury, Karl E., Pres.  
Stanton, F. J., 2nd Vice-Pres.  
Stanton, Seabury, Pres.  
Stearns, G. M., Jr., Pres.  
Stearns, L. N., Treas.  
Stedman, C. E., Vice-Pres.  
Steed, Leonard L., Vice-Pres.  
Steele, R. W., Vice-Pres.  
Stegman, L. H., Vice-Pres.  
Steinetz, B. G., Vice-Pres. and Treas.  
Stern, Geo. K., Sec.  
Stern, Louis F., Vice-Pres.  
Stern, R., Pres. and Treas.  
Stevens, C. N., Pres. and Treas.  
Stevens, Frank L., Chairman of Board  
Stevens, Fred N., Vice-Pres.  
Stevens, John, Jr., Vice-Pres.  
Stevenson, E. P., Pres.  
Stewart, E. P., Sec.  
Stille, J. L., Vice-Pres.  
Stilson, L. A., Vice-Pres.  
Stockler, D. L., Pres.  
Stone, Avery J., Treas., Sec.  
Stone, N. S., Sec.  
Stone, Robert M., Pres.  
Storey, O. W., Sec.  
Storrs, John T., Vice-Pres.  
Story, Austin P., Vice-Pres. and Treas.  
Stouck, V. W., Vice-Pres., 2nd Vice-Pres.  
Stowitts, F. H., Sec.  
Strange, Hugh, Sec.-Treas.

Strange, John G., Sec.  
Strange, M. M., Pres.  
Strange, Paul, Vice-Pres.  
Strassburger, William, Treas.  
Straus, Harry H., Pres.  
Stringfellow, Jr., B. B., Sec.  
Strouse, E., Sec.  
Stuart, Kimberly, 2nd Vice-Pres. and Sec.  
Stuhr, William S., Pres.  
Suky, Irma P., Sec.  
Sullivan, Francis R., Vice-Pres.  
Sullivan, J. L., Sec.-Treas.  
Suter, F. L., Vice-Pres.  
Suter, James F., Sec.  
Sutherland, L. W., Pres.  
Sutphin, Samuel B., Pres.  
Sutphin, Stuart B., Vice-Pres.  
Sutphin, Samuel R., Sec.  
Sutter, H. W., Vice-Pres.  
Swan, Douglas L., Vice-Pres. and Sec.-Treas.  
Swan, H. B., Pres.  
Swaney, Robert M., Sec.  
Swartwood, Howard A., Sec.  
Sweet, B. W., Treas.  
Sweet, J. M., Vice-Pres.  
Sweet, R. W., Pres.  
Symington, F. W., Vice-Pres.

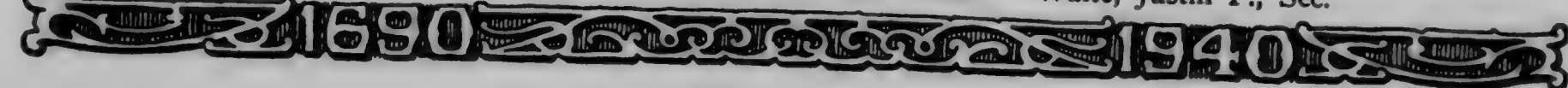
**T**  
Taft, J. B., Vice-Pres.  
Taggart, B. B., Chairman of Board  
Taggart, J. W., Vice-Pres.  
Taliaferro, Van Buren, Sec.  
Tarbell, G. H., Vice-Pres.  
Taylor, F. E., Vice-Pres. and Sec.  
Taylor, J. F., Vice-Pres.  
Taylor, John M., Pres.  
Taylor, Lane, Sec.-Treas.  
Taylor, T. C., Treas.  
Taylor, Wm. H., Sec.  
Telfer, H. R., Pres.  
Temple, Arthur, Vice-Pres.  
Tepper, G. Willing, Treas.  
Teren, N. G., Vice-Pres.  
Thayer, H. C., Treas.  
Thickens, J. H., Vice-Pres.  
Thomas, B. W., Pres.  
Thomas, M. A., Pres. and Treas.  
Thompson, Howard B., Sec.-Treas.  
Thompson, Alexander, Jr., Vice-Pres.  
Thompson, Logan G., Pres.  
Thorne, C. B., Vice-Pres.  
Thorne, A. M., Pres. and Treas.

Tilden, R. C., Vice-Pres.  
Tilton, H. B., Vice-Pres.  
Todd, James, Jr., Vice-Pres.  
Townsend, Jackson, Pres.  
Tracy, Horace C., 2nd Vice-Pres.  
Travers, Robert C., Pres.  
Treen, H. M., Vice-Pres. and Sec.  
Trieschmann, A., Vice-Pres.  
Trillich, B. L., Pres.  
Trinam, J. C., Pres.  
Trolin, Barnett, Pres., Sec.-Treas.  
Trubee, Dayton O., Vice-Pres. and Sec.  
Trubee, E. O., Treas.  
Trubee, Frank C., Sr., Pres.  
Truman, W. V., Sec.-Treas.  
Trumbower, Howard, Pres. and Treas.  
Trump, A. J., Treas.  
Tschirgi, Walter M., Sec.  
Tucker, E. C., Vice-Pres.  
Tullis, W. C., Sec.  
Turcotte, L., Sec.-Treas.  
Turner, D. G., Vice-Pres.  
Tuttle, W. H., Treas.  
Tuttrup, H. W., Treas.

**U**  
Uong, D. D., Vice-Pres.  
Upham, S. A., Pres.  
Upson, Charles A., Pres.  
Upson, W. H., Sec.-Treas.  
Utley, F. G., Vice-Pres.  
Utley, George S., Pres. and Treas.

**V**  
Van de Carr, C. R., Jr., Pres.  
Van Gilder, H. P., Sec.-Treas.  
Van Horn, E., Sec.-Treas.  
Van Horn, John B., Pres.  
Van Vleet, S. D., Sec.  
Vary, C. J., Sec.-Treas.  
Vaughan, L., Jr., Sec.-Treas.  
Vaughn, M. E., Treas.  
Venrick, E. E., Sec.-Treas.  
Verow, George W., Vice-Pres.  
Versfelt, W. H., Treas.  
Vihon, C. H., Pres.  
Voorhees, John L., Vice-Pres. and Treas.  
Vose, Louis E., Vice-Pres.

**W**  
Wade, Bernard, Treas.  
Wagonseller, E. A., Sec.  
Waite, C. H., Pres. and Treas.  
Waite, Justin P., Sec.





## OFFICERS OF PAPER CONCERNS IN U. S. — Continued

Wakeman, F. S., Vice-Pres.  
Wales, E. S., Sec.  
Walker, C. R., Vice-Pres.  
Walker, E. L., Vice-Pres.  
Walker, Paul, Vice-Pres.  
Walker, W. W., Vice-Pres.  
Wall, A. L., Pres.  
Wallace, George R., Pres. and Treas.  
Wallace, P. L., Vice-Pres.  
Wallace, R. G., Vice-Pres.  
Walsh, Arthur R., Sec.  
Walsh, D. J., Sr., Vice-Pres.  
Walsh, Eleanor, Sec.  
Walsh, J. J., Pres.  
Walter, J. W., Sec.-Treas.  
Walther, Charles W., Pres.  
Walther, Frieda, Vice-Pres.  
Walton, W. S., Treas.  
Ward, B. C., Treas.  
Ward, Wm. J., Jr., Vice-Pres.  
Warner, H. D., Sec.-Treas.  
Warner, Mildred W., Pres., Vice-Pres.  
Warner, William J., Pres.  
Warren, Eugene, Treas.  
Warren, Speed, Sec.-Treas.  
Watjen, Harold P., Sec.-Treas.  
Watjen, William E., Pres.  
Watson, George C., Pres. and Treas.  
Watts, Ralph J., Treas.  
Watzek, J. W., Jr., Vice-Pres.  
Weaver, H. R., Vice-Pres. and Treas.  
Wehman, F. G., Sec.-Treas.  
Weihenmayer, E. A., Vice-Pres.  
Weis, J. B., Vice-Pres.  
Weis, L. R., Treas.  
Wellhouse, Sidney L., Pres.  
Wellman, H. O., Sec.  
Wells, Donald, Vice-Pres.  
Wells, G. E., Sec.-Treas.  
Wells, H. D., Pres.  
Wells, J. P., Sec.  
Wells, V. H., Sec.-Treas.  
Welsch, William  
Wemyss, C. T., Sec.  
Wemyss, J. C., Treas.  
Wemyss, J. S., Pres. and Treas.  
Wertheimer, R. S., Vice-Pres.  
West, W. A., Pres.  
Weston, E. W., Sec.  
Weston, I. D., Vice-Pres.  
Weyerhaeuser, F., Sec.  
Weyerhaeuser, F. E., Pres.

Weyerhaeuser, R. M., Chairman of Board, Pres.  
Whitaker, L. E., Vice-Pres.  
Whitcomb, William A., Pres.  
White, A. F., Pres., Claremont Paper Co., Inc.  
White, G. W., Sec.  
White, DeGray, Sec.  
White, Ferdinand R., Pres.  
White, Frank D., Sec.  
White, G. W. Blunt, Vice-Pres.  
White, Jos. B., Pres.  
White, W. C., Jr., Vice-Pres.  
White, W. C., Treas.  
Whitehouse, Arnold, Pres.  
Whitehouse, J. H., Treas.  
Whiting, E. C., Treas.  
Whiting, F. B., Pres.  
Whiting, Fairfield, Sec.  
Whiting, Geo. A., Treas.  
Whiting, James G., Pres.  
Whiting, William, Pres.  
Whittemore, E. B., Pres. and Treas.  
Wilcox, H. A., Partner  
Wiles, H. N., Treas.  
Williams, G. M. B., Sec.  
Williams, H., Pres.  
Williams, J. N. S., Sec.-Treas.  
Williams, S. A., Vice-Pres.  
Williamson, F. E., Vice-Pres.  
Williamson, G. E., Treas.  
Williamson, Harry, Pres.  
Wilmarth, M. L. C., Sec.  
Wilsey, E. S., Pres. and Treas.  
Wilson, F. Vaux, Jr., Vice-Pres.  
Wilson, Howard A., Treas.  
Wilson, J. H., Sec.  
Wilson, N. W., Pres.  
Wilson, P. M., Sec.-Treas.  
Wing, F. P., Treas.  
Wingate, Herbert A., Sec.-Treas.  
Winkler, C. J., Sec.  
Winne, George T., Jr., Vice-Pres.  
Winter, Courtney P., Sec.  
Wintgens, H. G., Vice-Pres.  
Wisener, Geo. E., Pres.  
Wishnick, D. M., Sec.  
Wishnick, S., Pres.  
Wisotzkey, John U., Vice-Pres.  
Witherspoon, A. W., Pres.  
Witherspoon, W. W., Sec. and Treas.  
Wocel, H. G., Treas.  
Woerner, Louis, Sec.  
Wohnsiedler, John, Vice-Pres.  
Wood, A. H., Vice-Pres.

Wood, C. L., Vice-Pres.  
Wood, Chas. G., Sec.-Treas.  
Wood, D. H., Pres.  
Wood, F. P., Pres.  
Wood, Irving S., Pres. and Treas.  
Wood, Wm. H., Sec.  
Woodson, A. P., Pres.  
Worcester, C. H., Chairman of Board and Treas.  
Word, Thomas N., Treas.  
Worrell, R. I., Vice-Pres.  
Wrase, W. A., Vice-Pres.  
Wright, J. P., Pres.  
Wright, M. E., Sec.-Treas.  
Wright, N. N., Vice-Pres.  
Wyman, W. S., Pres.

### Y

Yates, C. C., Pres.  
Yates, Olen V., Vice-Pres. and Treas.  
Yates, S. S., Exec. Vice-Pres. and Treas.  
Yawkey, C. C., Chairman of Board, Vice-Pres.  
Yawman, F. J., Vice-Pres.  
Yoder, H. H., Vice-Pres.  
Yoder, Isaac C., Prop.  
Yoerg, L. M., Pres.  
Young, Coulter D., Sec.  
Young, Ernest, Pres.  
Young, L. V., Vice-Pres.  
Young, Leona V., Sec.  
Young, Nicholas B., Sec.-Treas.  
Young, R. J., Sec.  
Young, Vertries, Exec. Vice-Pres.  
Young, Wayne, Pres.  
Young, Wilbur E., Vice-Pres.  
Youngman, F. N., Vice-Pres.  
Yountsey, Wright, Sec.

### Z

Zartman, Fred B., Pres. and Treas.  
Zellerbach, H. L., Exec. Vice-Pres.  
Zellerbach, I., Chairman of Exec. Committee, Vice-Pres.  
Zellerbach, J. D., Pres. Chairman of Board, Vice-Pres., Exec. Vice-Pres., Rayonier, Inc.  
Ziegler, Samuel W., Vice-Pres. and Sec.  
Zimmerman, L. S., Treas.  
Zink, J. D., Vice-Pres.  
Zoellner, Edna L., Sec.  
Zoller, Scott, Sec.-Treas.

## Statistical Table of Paper Making Concerns in the United States and Canada

THE table presented herewith shows the number of concerns engaged in the manufacture of pulp and paper in the United States and Canada and the number of pulp and paper mills operated. This data is taken from the 1941 edition of Lockwood's Directory of the Paper and Allied Trades which is now on the press and which will be issued shortly.

### Earlier Statistics Compared

The information given in this table is especially interesting when compared with earlier statistics. Probably the most reliable of the early statistics of the industry were those returned to congress by Tench Cox of Philadelphia, a recognized statistician and economist in 1813. These statistics reported mills in eighteen states with a total of 202. Pennsylvania easily led the list, having 64 as compared to New York 28, Massachusetts 23, Connecticut 19, New Jersey 14 and Vermont 11.

These statistics were not regarded as very accurate, but they were a great improvement over any figures that had been available previously.

### First Statistics in Lockwood Directory

Lockwood's Directory, which was first issued in 1873, presented its first statistical table for 1873 and 1875 in its second edition printed in 1875. This gave

Location	Number of Firms	Number of Paper Mills	Number of Pulp Mills
Alabama	5	5	5
Arkansas	2	2	2
California	10	13	0
Colorado	1	1	0
Connecticut	27	31	0
Delaware	5	6	0
District of Columbia	1	1	0
Florida	8	6	6
Georgia	5	3	3
Hawaiian Islands	1	1	1
Illinois	21	26	0
Indiana	14	16	0
Iowa	3	4	0
Kansas	2	2	0
Louisiana	7	8	7
Maine	20	25	33
Maryland	9	9	1
Massachusetts	59	88	3
Michigan	37	54	9
Minnesota	8	11	11
Mississippi	4	4	3
Missouri	1	1	0
New Hampshire	22	30	7
New Jersey	33	41	1
New York	99	119	46
North Carolina	8	8	6
Ohio	45	49	3
Oregon	7	6	11
Pennsylvania	46	53	11
Philippine Islands	1	1	1

the number of concerns in 1873 as 712 which operated 819 mills. This compared with 773 concerns which operated 896 mills in 1875. By the time the 1873 statistics were published, New York had gained a commanding lead in the industry, having 176 concerns which operated 191 mills. Its nearest competitor was Massachusetts, but there were only 91 concerns there which operated 135 mills. Pennsylvania came next with 84 concerns, operating 94 mills, and then followed Connecticut with 76 concerns operating 78 mills, New Jersey with 37 concerns operating 37 mills, New Hampshire with 29 concerns operating 33 mills, Maryland with 23 concerns operating 28 mills and Illinois with 18 concerns operating 21 mills.

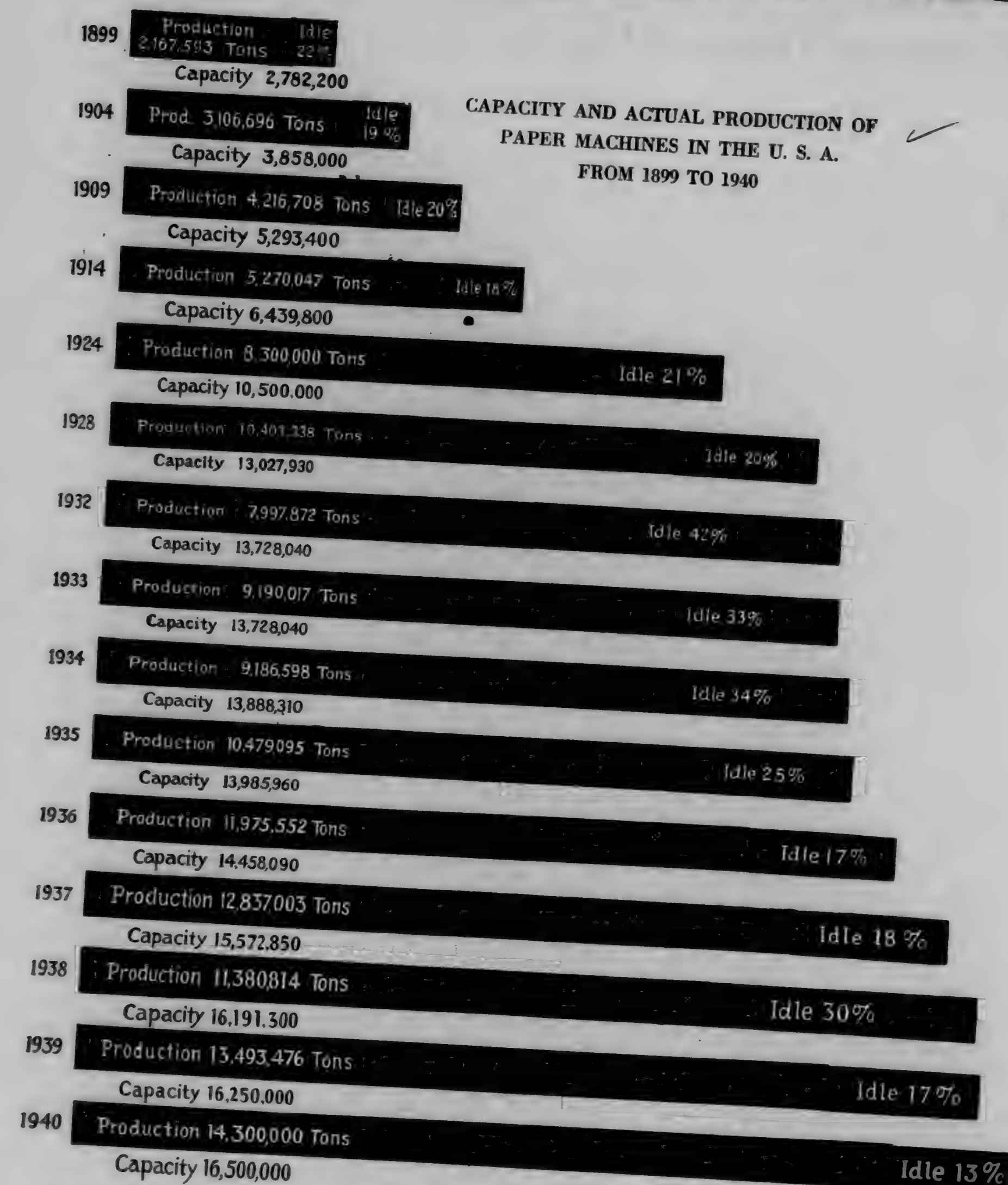
### The Leading States

By referring to the table, it will be seen that New York, Massachusetts and Pennsylvania are the leading states as regards the number of concerns and mills just as they were when the first Lockwood Table for 1873 was published. Wisconsin, however, with its 40 concerns and 52 mills at present shows a great gain as do the Pacific Coast and the Southern States. It must be remembered also that the capacities of the mills which have been built in late years in these sections are vastly larger than the capacities of the old time mills.

Location	Number of Firms	Number of Paper Mills	Number of Pulp Mills
Rhode Island	1	1	0
South Carolina	4	4	4
Tennessee	8	8	3
Texas	3	2	2
Vermont	8	8	3
Virginia	13	14	10
Washington	15	13	26
West Virginia	5	5	0
Wisconsin	40	52	36
Total	535*	731	254
Canada:			
British Columbia	5	4	8
Manitoba	1	1	2
New Brunswick	6	4	10
Nova Scotia	5	1	6
Ontario	30	35	35
Quebec	40	47	52
Total	84*	92	113
Newfoundland	2	2	5
Idle Mills:			
United States	43	50	7
Canada	7	4	8
Newfoundland	1	0	1

\* Firms listed in several States and Provinces in which they have mills but deductions made for duplicates in totals for United States and Canada.





## Paper Production Shows Steady Expansion

**T**HE notable stability of the paper industry is primarily due to the great utility of its many products. Paper has become a necessity and new and important uses for various kinds of paper and for wood pulp, which is the most important basic material from which the bulk of paper, paper board and other paper products is manufactured, are constantly being found.

An examination of the chart on the opposite page will show the steady expansion of the industry. This growth has been rapid and sustained and very few of the older major industries in the United States can equal the progress made by the paper industry. In a late analysis of the data compiled by the National Conference Board and the American Paper and Pulp Association, it was shown that, compared on an index basis with agriculture, mining, manufacturing, and railway and telegraph, only the mining industry shows an increase comparable with the paper industry during the last century.

### Paper Output Continues to Increase

In comparison with mining production, the paper industry has continued to expand, while mining has leveled off and has made little advance in the decade from 1920 to 1930. In railways and telegraphs expansion since 1920 has been very small and the present trend is downward. The 1929 production of automobiles has never been surpassed, while the chart on the opposite page shows that the 1929 production of paper totaling 11,140,235 tons, was surpassed in 1936 with 11,975,552 tons, in 1937 with 12,837,003 tons, in 1939 with 13,441,500 tons, and in 1940 with an estimated production of 14,300,000 tons.

As the manufacture of paper is a huge industry, with its products valued at more than \$1,000,000,000, and its investment in land, buildings and equipment also more than \$1,000,000,000, there are few, if any, other industries offering a more valuable market for the sale of equipment and supplies than the American paper industry. In making even a casual survey of the paper industry it will at once be noted that, compared with other major industries, the paper industry has a somewhat high plant investment per dollar of manufactured product. In other words, for every 1.6 dollar of products manufactured yearly, a dollar of investment in plant is required. Other industries, such as food, textiles and rubber, do not require as high an investment ratio. The paper industry has also a high ratio of salaries and labor. The reason why a large unit investment is required, is that much expensive equipment and supplies are necessary for the mass production of paper and paper products. Quality in equipment and materials is of great importance.

The paper industry requires a high proportion of

technically trained and skilled workers. The numerous technical-control and research operations in making wood pulp alone, require the services of chemists and chemical engineers. A sheet of paper is made on a highly complicated Fourdrinier paper making machine, tended by an expert paper maker who must be a highly skilled workman. Throughout the mill, in both paper and pulp production, a staff of highly technically trained men, with a low plant ratio in common labor, are important factors in the rapid progress made by the industry.

The interest of the paper industry in the national economy in the forest situation, is of great importance. In the value of its products, the paper industry ranks high among other forest industries but its wood requirements are still relatively unimportant in volume, although 9,368,013 cords of pulpwood were consumed by domestic mills in 1937.

### Notable Increase in Productive Efficiency

Increases in productive efficiency in the paper and allied products industry since the early 'twenties are, according to a recent survey made by The Brookings Institution, of Washington, D. C., reaching the consumer in the form of price reductions amounting to \$172,000,000 annually. From 1923 to 1938 man-hour productivity increased 52 per cent, thus enabling the consumer of paper to purchase 40 per cent more for his money. Output, increasing 50 per cent, kept pace with productivity and, although working hours were substantially reduced, the number of workers increased 12 per cent, and hourly wages rose 8.6 per cent. Total dollar earnings increased 7 per cent, thus labor gained in buying power as well as in substantially increased leisure.

### Important Technological Advances Continue

Any study of the present economic status and notable stability of the paper industry must disclose that the advancing trend in the industry is largely contributed by technological developments within the industry, which not only finds new uses for paper and paper products, such as the paper board container, barrel or drum, paper board building materials simulating tile and many other fine finishes, but also new uses for wood pulp in the manufacture of textiles and in plastics. The paper board container division of the industry is one of the most rapidly expanding enterprises and paper board shipping containers continue to replace wood shipping packages. One of the latest examples in which paper board is about to be substituted for wood, is that of the 30-dozen egg shipping case. Many other uses of paper in some form substituting other materials long used could be mentioned but the very few given are sufficient to indicate a steady expansion and a sustained stability for the paper industry in the future.



## Achievements of Technical Association of the Pulp and Paper Industry

**A**BOUT 25 years ago there was formed the Technical Section of the American Paper and Pulp Association, the forerunner of the Technical Association of the Pulp and Paper Industry, for the purpose of bringing about improved conditions in the manufacture of pulp and paper, especially in regard to the advancement in the technical and scientific aspects.

The preliminary meeting for organization of the Technical Section was held on February 18, 1915 at the annual meeting of A.P.P.A., and the actual organization was effected in Chicago, Ill. on May 6, 1915. The first general meeting was held in Grand Central Palace, New York, N. Y. on September 23, 1915 at which time a constitution was adopted. The objects of the section as stated in the constitution were: (1) to stimulate interest in the science of pulp and papermaking; (2) to provide means for the interchange of ideas among its members; (3) to encourage original investigation.

The organization committee consisted of: Henry E. Fletcher, Fletcher Paper Company; W. G. MacNaughton, Nekoosa-Edwards Paper Company; Ernst Mahler, Kimberly-Clark Company; Charles F. Rhodes, International Paper Company; Henry F. Obermanns, Hammernill Paper Company; Ralph H. McKee, University of Maine, and Thomas J. Keenan, *Paper*.

At the meeting on September 23, 1915 the following committees were appointed.

**EXECUTIVE COMMITTEE**—H. E. Fletcher, chairman; W. G. MacNaughton; Ernst Mahler; C. F. Rhodes; H. F. Obermanns.

**SECRETARY-TREASURER**—T. J. Keenan.  
**PUBLICATION COMMITTEE**—C. F. Rhodes, H. F. Obermanns.  
**SODA PULP COMMITTEE**—M. L. Griffin, chairman; S. D. Wells, Edwin Sutermeister.  
**SULPHATE PULP COMMITTEE**—Otto Kress, chairman; J. E. Hedin, G. S. Holmes.

**SULPHITE PULP COMMITTEE**—R. B. Wolf, chairman; Frederic C. Clark; C. C. Heritage.

**STANDARD METHODS OF TESTING MATERIALS USED IN THE MANUFACTURE OF PAPER COMMITTEE**—H. P. Cartuth, chairman, R. C. Hatch; Max Cline.

**GROUNDWOOD COMMITTEE**—D. L. Bellinger, chairman.

In the latter part of 1915 a prize competi-

tion was instituted for papers or monographs dealing with the solution of the following technical problems for which \$100 was offered for the best paper on each subject:

(1) The various causes for the deterioration of the Fourdrinier wires and steps to be taken in the prolongation of the life of the wires.

(2) How can pitch in sulphite pulp be eliminated?

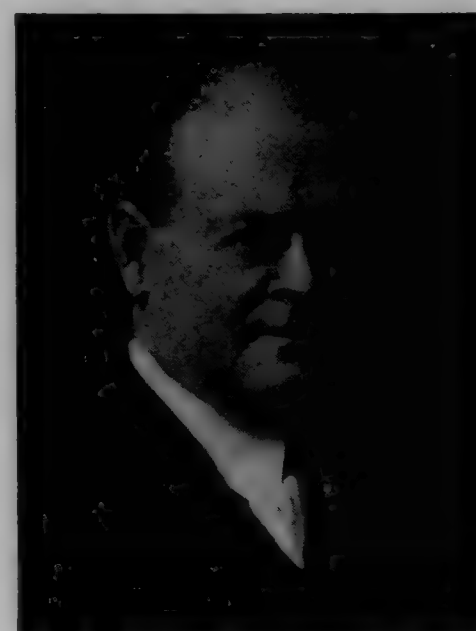
(3) The effect of the order and time of alum, rosin, and color on the retention of color.

(4) The retention of the various mineral fillers used in papermaking and their effect on the life of the machine clothing and the quality of the paper.

At the annual meeting on February 16-17, 1916 the Technical Section was reorganized on an independent basis as the Technical Association of the Pulp and Paper Industry (TAP-



T. J. KEENAN W. G. MACNAUGHTON R. G. MACDONALD



H. E. FLETCHER



W. H. SWANSON

PI), absolutely separate and distinct in its administration, maintaining its general interest in all that pertained to the industry. An editorial from *Paper* (Feb. 23, 1916) says in part: "This Technical Association is the baby of the paper trade family, nevertheless, it has given so marvelously that it has gained the strength to stand alone and speak for itself in an astoundingly short period. The membership has increased most encouragingly and the active, enthusiastic interest in the work of the association indicates the accomplishment of many good things in behalf of the industry. There is no branch of the trade more promising in important results. What has already been accomplished is but a slight indication of what may be expected."

W. G. MacNaughton, in reporting to the convention, on February 17, 1916, for the executive committee said: "We feel that the Technical Association of the Pulp and Paper Industry has been started on a firm basis, and we hope it will continue to grow in importance as well as numbers and quality, so as the years go by the Technical Association will be regarded as a high class engineering and technical association which will not only tend to the improvement of the quality of the members connected with the industry but also affect the practical operation of the mills, because after all any changes, particularly the practical mechanical results, are the results used to gage the success of any association."

### Present Status

In this Silver Anniversary year the membership numbers over 1900 engineers, executives, chemists, superintendents, supervisors, and students. Corporate Members, pulp and paper manufacturers, number 84; and Sustaining Members, companies in a related industry or service, number 95. There are TAPPI members in every papermaking country in the world today.

The growth in membership and service to the pulp and paper and related industries has fully justified the initiative and labors of the founders. From small discussion groups TAPPI has grown so that the national conventions are divided in sessions dealing with the various phases of the industry covering a multiplicity of subjects each presented by a specialist and then discussed in open forum. About one hundred papers were presented at the 1940 Annual Meeting.

Two national conventions are held each year, the Annual Meeting is held in New York City during the last full week of February; and the Fall Meeting is held in various papermaking centers in the fall. These meetings provide means for the interchange of ideas and information for the advancement of the science and manufacture of pulp and paper. Most of the papers are published in *Paper Trade Journal*, the official publication of TAPPI and all meeting papers, discussions, and reports are published in *Technical Association Papers*, a cloth-bound volume of 750 pages.

### LOCAL SECTIONS

As TAPPI grew larger and its value became more apparent, the need for regional activities was solved by the formation of local sections. Local groups are given a charter by TAPPI when they have shown their ability to function under their own leadership. In seven regions there are local sections chartered by TAPPI, and they are known as: Pacific Section, organized in 1929, at Seattle, Wash.; Lakes States Section, organized in 1930 at Menasha, Wis.; Delaware Valley Section, organized in 1931 at Philadelphia, Pa.; Kalamazoo Valley Section, organized in 1931 at Kalamazoo, Mich.; New England Section, organized in 1932 at Holyoke, Mass.; Ohio Section, organized in 1934 at Middletown, Ohio; and the Empire State Section, organized in 1935 at Syracuse, N. Y.

In addition the Southern Pulp and Paper Club, made up largely of TAPPI members although not a local section, holds meetings in southeastern cities. In June, 1940 there was formed an organization of TAPPI members from northern New England known as the Proposed Maine-New Hampshire Section.

### DIVISIONS AND COMMITTEES

The division and committee organization of TAPPI constitutes the principal means within the association for the collection and dissemination of technical knowledge either by codification of existing knowledge for easy use and reference or by the planned production of new knowledge.

Each division is made up of appropriate committees and these are frequently divided into subcommittees to do special work. The entire divisional organization works under the administrative direction of the vice president who works directly with the division chairman and the Secretary.

There are seven divisions: Engineering; Industrial; Converting and Consuming; Research Development; Pulp Manufacture; Paper Manufacture, and Testing. There are also miscellaneous committees and delegates to other organizations. Under the Engineering Division, there are the following committees: Heat and Power, Materials of Construction, and Water Committee. Under the Industrial Division, the following committees function: Fibrous Raw Materials, Industrial Engineering, and Nonfibrous Raw Materials. Under the Converting and Consuming Division are the following committees: Coating, Container, and Graphic Arts. Under the Research Development Division are the following committees: Abstracts and Bibliography, Fundamental Research, Bacterial Control Methods, and Patents. Under the Pulp Manufacture Division are the following committees: Acid Pulping, Alkaline Pulping, Mechanical Pulping, and Pulp Purification. Under the Paper Manufacture Division are the following committees: Preparation of Nonfibrous Materials, Stuff Preparation, and Forming and Finishing. Under the Testing Division are the following committees: Fibrous Materials Testing, Pulp Testing, Nonfibrous Materials Testing,



Chemical Methods Coordination, Microscopical Analysis, Paper Testing, and Optical Properties. The miscellaneous committees consist of the Finance, Standards, Research Appropriation, Certified Pulp Testers Bureau, and Joint Textbook. There are TAPPI delegates to the following organizations, serving on various committees: American Society of Mechanical Engineers, American Society for Testing Materials, and the Inter-Society Color Council.

There are over 300 members serving on committees and subcommittees who give their services voluntarily and without remuneration.

The association is a member of, is affiliated with, or is represented in a number of organizations such as: the American Paper and Pulp Association; Technical Section, Canadian Pulp and Paper Association; Technical Section, Papermakers' Association of Great Britain and Ireland; Verein der Zellstoff und Papierchemiker u-Ingenieure; American Society for Testing Materials; American Society of Mechanical Engineers; and Inter-Society Color Council. The association is a Member of the Institute of Paper Chemistry.

#### BENEFITS TO MEMBERS

Each member of the Technical Association of the Pulp and Paper Industry receives the following publications as a part of his membership benefits:

*Technical Association Papers*, a cloth-bound volume of over 750 pages, containing the record of technical development of the pulp and paper and related industries. It contains the annual and fall convention papers and reports of committees, issued annually.

*Paper Trade Journal*, a weekly containing the TAPPI Section, devoted to papers presented at national and local meetings, and contributed articles. Outside the technical section other material of general interest as news, market, construction, financial, and other reports are published.

TAPPI Year Book, an annual containing an alphabetical and geographical roster of members, together with a detailed record of all association activities, suggestions for authors, constitution, indexes to the standards and data sheets, and other useful matter.

TAPPI Standards, a loose-leaf manual containing the tentative, suggested, and official testing methods, specifications, and recommended practices.

TAPPI Data Sheets, a loose-leaf manual of engineering, chemical, and operating data for engineers, chemists, and other operating men.

TAPPI Bibliography of Paper Making and U. S. Patent List, a cloth-bound volume issued annually and covering all books and periodicals dealing with the manufacture of pulp and paper.

The association assists the pulp and paper and related industries in obtaining employees to meet their requirements and assists its members in obtaining employment through the Secretary's office.

To further the services of TAPPI to its members

and the industry, appropriations of money are made to assist committees in their activities. Research funds are administered by the Research Appropriations Committee with the approval of the Executive Committee.

#### Work TAPPI Has Done

##### WAR SERVICE

At the time the Technical Association of the Pulp and Paper Industry was organized, the World War of 1914-1918 was in progress. The part played by TAPPI was commenced at a meeting during the annual convention held on February 6, 1918. Milo R. Maltbie and Capt. H. C. Porter of the War Department addressed the meeting and stressed the extremely serious inadequacy of the supply of toluene. Toluene is essential in the manufacture of the high explosive trinitrotoluene (called TNT) and can be produced from liquors used in cooking spruce, balsam, etc. in the sulphite process. Capt. Porter pointed out the extreme urgency of securing every gallon of toluene possible. H. P. Carruth, then president of TAPPI, appointed a Toluene Committee to bring the matter to the attention of the industry. The committee consisted of H. E. Fletcher, chairman, F. M. Williams, W. E. Byron Baker, P. A. Paulson, H. F. Obermanns, M. W. Heddon, G. K. Spence, E. R. Barker, A. W. Nickerson, and L. H. Shipman.

In March, 1918 President Carruth appointed a War Service Committee of TAPPI composed of H. P. Carruth, chairman; G. E. Williamson, in charge of engineering problems; R. S. Hatch, in charge of chemical problems; H. E. Fletcher, in charge of pulp problems; T. J. Keenan, in charge of correspondence; and Frederic C. Clark, Washington representative. The development of the regulations that were issued by the Pulp and Paper Division of the War Industries Board showed the need of technical information on a great many points. One of these, the consumption of chlorine, was very forcibly brought out in connection with bleaching. Chlorine and its compounds was used in the World War in many different ways. One of the many uses of chlorine was in the production of deadly poison gases used in gas warfare. Another use was for the disinfecting of water supplies.

Some of the problems discussed by the TAPPI War Service Committee were: bleach, sulphur, wool, cotton, wrapping papers and paperboxes, universal standard size basis for all grades of paper, wood pulp for nitrocellulose, and rosin for sizing purposes.

##### PUBLICATIONS

The first volume of *Technical Association Papers* was published in 1918 in paper covers and consisted of 64 pages. In 1935 the binding was changed to cloth for greater durability and better appearance. The latest volume of *Technical Association Papers* Series XXIII published in June, 1940 contains 752 pages of scientific articles, addresses, reports of committees, and other useful matter.

The textbooks entitled *Manufacture of Pulp and Paper* published in five volumes resulted from a cooperative undertaking of the Technical Association of the Pulp and Paper Industry with the Technical Section of the Canadian Pulp and Paper Association. Over 31,000 volumes have been sold. The preparation, editing, and publication of the textbooks are done under the direction of the Joint Textbook Committee. These books are the most comprehensive, authentic, and up-to-date available in any language. They represent the very best modern practice and technique in the manufacture of pulp and paper. Each section was written by an expert in his line.

Another contribution of the Technical Association to the factual wealth of the pulp and paper industry is the result of the work of the TAPPI Committee on Abstracts and Bibliography. Each year TAPPI publishes a volume entitled *Bibliography of Paper Making and U. S. Patent List*.

More than one hundred testing methods, recommended practices, and specifications have been adopted by the association and are known as TAPPI Standards. These standards have attained a high prestige in industry and commerce and are considered to be the basic authority on the subjects covered.

An important part of the association's activity resulted from its rapid growth and brought about the need for local sections. There are seven official TAPPI Local Sections located in major pulp- and papermaking regions.

TAPPI Special Reports are based on data obtained in surveys on manufacturing, management, engineering, and other types of problems. Over 300 reports have been issued to individual members who cooperated in the surveys and to the Corporate Members.

A new service of the Technical Association to its members was commenced in 1939 in the issuance of TAPPI Data Sheets in loose-leaf form. Engineering handbooks do not contain much engineering, chemical, or other data primarily applicable to the pulp and paper industry. TAPPI Data Sheets pro-

vide the means to fill the voids in ordinary handbooks. This service further reflects the invaluable part the Technical Association plays in the interests of the pulp and paper industry as a whole and in particular to all TAPPI Members, both company and individual. About 70 pages of data will be sent free to TAPPI Members in December, 1940.

Vocational training was a subject in which TAPPI took an active part by cooperating with the Federal Board for Vocational Education. The book which resulted from this study, *Vocational Training for the Pulp and Paper Industry* (Bulletin 168, Trade and Industrial Series 49) published in 1933, gives a job analysis with suggestions on the organization and operation of training programs.

A special committee of TAPPI called the Research Promotion Committee was appointed to select meritorious research projects for recommendation to the Executive Committee.

As a recognition for extraordinary achievements definitely contributing to the scientific and technical progress of the pulp and paper industry, the association has awarded nine gold medals since 1928. This award is known as the TAPPI Medal award.

The Technical Association contributed a substantial amount of money and many TAPPI Members contributed in the work of preparing a book entitled *The Dictionary of Paper* in cooperation with the American Paper and Pulp Association. The Technical Association contributed financially to the publishing of the book *Color Charts for Fiber Stains*. This book provides a complete set of color charts showing the colors of various stains when used on the various papermaking raw materials. This work was done in cooperation with the American Paper and Pulp Association and The Institute of Paper Chemistry.

The growth and progress of the Technical Association during its 25 years of existence has been phenomenal.

The officers of the Technical Association of the Pulp and Paper Industry from its inception to the present time follow:

Year	President	Present Company Connection	Vice President	Present Company Connection
1915-16	H. E. Fletcher	Fletcher Paper Co.	W. G. MacNaughton	News Print Service Bureau
1917*	W. G. MacNaughton	News Print Service Bureau	H. P. Carruth	Brown Company
1917	H. P. Carruth	Brown Company	W. G. MacNaughton	News Print Service Bureau
1918	H. P. Carruth	Brown Company	H. F. Obermanns	Hammermill Paper Co.
1919-20	R. S. Hatch	Weyerhaeuser Timber Co.	R. B. Wolf	Weyerhaeuser Timber Co.
1921-22	G. E. Williamson	Strathmore Paper Co.	F. C. Clark	Consulting Engineer
1923-24	H. S. Taylor	Consulting Engineer	G. N. Collins	Consulting Engineer
1925-26	G. K. Spence	Castanea Paper Co.	E. C. Tucker	Crocker McElwain Co.
1927-28	E. C. Tucker	Crocker-McElwain	P. H. Glatfelter	P. H. Glatfelter Co.
1929	P. H. Glatfelter	P. H. Glatfelter Co.	M. A. Krimmel	Hammermill Paper Co.
1930	M. A. Krimmel	Hammermill Paper Co.	R. H. Laftman	National Containers, Inc.
1931	M. A. Krimmel	Hammermill Paper Co.	Allen Abrams	Marathon Paper Mills Co.
1932-33	Allen Abrams	Marathon Paper Mills Co.	C. C. Heritage	Northwest Paper Co.
1934-35	C. C. Heritage	Northwest Paper Co.	G. N. Collins	Consulting Engineer
1936-37	G. N. Collins	Consulting Engineer	W. R. Maull	Mead Corp.
1938	F. C. Clark	Consulting Engineer	H. R. Murdock	Champion Paper & Fibre Co.
1939	F. C. Clark	Consulting Engineer	W. H. Swanson	Kimberly Clark Corp.
1940	W. H. Swanson	Kimberly Clark Corp.	R. A. Hayward	Kalamazoo Vegetable Parchment Co.

\* W. G. MacNaughton was elected president in 1917, but he changed positions with H. P. Carruth who was elected vice president. Mr. MacNaughton went to the Inland Empire Company, Spokane, Washington, at that time.  
T. J. Keenan served as secretary-treasurer of the association from 1915 to 1921, W. G. MacNaughton served from 1922 to 1927, and R. G. Macdonald has served from 1927 to the present time.



## American Paper and Pulp Association And Affiliated Organizations

THE list of officers of the American Paper and Pulp Association and its affiliated organizations is presented herewith. The A. P. and P. A., which was formed at Saratoga Springs, N. Y., in 1878, is not only one of the oldest trade organizations in any field, but its accomplishments in the pulp and paper field also entitle it to high ranking. In the lists which follow, it has not been possible to give addresses, but these can be obtained in the new edition of Lockwood's Directory of the Paper and Allied Trades which is now on the press and which will be issued shortly.

### American Paper and Pulp Association

President, J. L. Riegel, Riegel Paper Corporation. Vice-Presidents: D. K. Brown, Neehan Paper Company; Hugh J. Chisholm, Oxford Paper Company; R. J. Cullen, International Paper Company; D. C. Everest, Marathon Paper Mills Company; R. K. Ferguson, St. Regis Paper Company; Ralph A. Hayward, Kalamazoo Vegetable Parchment Company; W. B. Merlin, Hollingsworth & Whitney Company; John R. Miller, West Virginia Pulp and Paper Company; W. I. Osborne, Jr., Cornell Wood Products Company; Cola G. Parker, Kimberly-Clark Corporation; Norman W. Wilson, Hammermill Paper Company; Vertrees Young, Gaylord Container Corporation, and J. D. Zellerbach, Crown Zellerbach Corp.

Executive Secretary, E. W. Tinker.

The following are divisional associations of the American Paper and Pulp Association:

#### BLOTTING PAPER MANUFACTURERS ASSOCIATION

President, Henry S. Mead, Wrenn Paper Company.

Vice-President, U. S. Bratton, Jr., Rochester Paper Company.

Secretary-Treasurer, James L. Ritchie.

#### BOOK PAPER MANUFACTURERS ASSOCIATION

Treasurer, P. H. Glatfelter, P. H. Glatfelter Company.

Secretary and Assistant Treasurer, C. L. Barnum.

#### BRISTOL BOARD MANUFACTURERS GROUP

Chairman, James B. Ramage, Franklin Paper Company.

Vice-Chairman, Joseph E. Holmes, Chemical Paper Manufacturing Company.

Secretary-Treasurer, James L. Ritchie.

Executive Committee: Norman Harrower, Linton Brothers & Co.; Joseph E. Holmes, Chemical Paper Manufacturing Company; James F. Ryland, Standard Paper Manufacturing Company; R. I. Worrell, Wheelwright Papers, Inc.; James B. Ramage, Franklin Paper Company; Kendall Wyman, Champion Paper and Fibre Company; Edward

Bailey, Hollingsworth & Whitney Company; B. C. Hopper, Hopper Paper Company, and Carlton W. Smith, Miamisburg Paper Company.

#### CARDBOARD MANUFACTURERS ASSOCIATION

President, Malcolm B. Lowe, Lowe Paper Company.

Vice-President, F. C. Heinritz, Appleton Coated Paper Company.

Secretary-Treasurer, James L. Ritchie.

Executive Committee: Herman Harrigan, District of Columbia Paper Mills, Inc.; Joseph A. Moses, Falulah Paper Company; F. C. Heinritz, Appleton Coated Paper Company, and Malcolm B. Lowe, Lowe Paper Company.

#### FIBRE BOARD MANUFACTURERS ASSOCIATION

President, C. F. Jameson, Milton Leatherboard Company.

Secretary-Treasurer, Campbell Bosson.

Executive Committee: E. H. Norton, C. H. Norton Company; John L. Norton, F. E. Norton Sons, Inc.; Ernest C. Blackwell, Spaulding Fibre Company, and C. F. Jameson, Milton Leatherboard Company.

#### GLASSINE AND GREASEPROOF MANUFACTURERS ASSOCIATION

Executive Committee: Chairman, Folke Becker, Rhineland Paper Company; Olaf Hedstrom; Paul E. Hodgdon; Harry B. Kuhns; Paul F. Moore; Robert F. Nelson, and John L. Riegel.

Secretary-Treasurer, Thomas J. Burke.

#### GROUNDWOOD PAPER MANUFACTURERS ASSOCIATION

President, E. G. Murray, St. Regis Paper Company.

Executive Vice-President, R. E. Canfield, Wise, Corlett & Canfield.

Vice-Presidents, W. C. Shorter, International Paper Company, and C. K. Andrews, Blandin Paper Company.

Secretary-Treasurer, E. O. Merchant.

Board of Governors: E. G. Murray, Walter C. Shorter, C. K. Andrews, Aubrey Crabtree and W. A. Munro.

#### KRAFT PAPER ASSOCIATION

President, N. S. Stone, Mosinee Paper Mills Company.

Vice-President, E. R. Gray, St. Regis Paper Company.

Secretary-Treasurer, S. M. Hudson.

#### PAPER SHIPPING SACK MANUFACTURERS' ASSOCIATION

President, W. J. Dixon.

Vice-President, F. G. Bemis.

Executive Secretary, Frank Pocta.

#### SODA PULP MANUFACTURERS ASSOCIATION

Chairman, Eustis Paine, New York & Pennsylvania Company.

Vice-Chairman, Amor Hollingsworth, Penobscot Chemical Fibre Company.

Secretary-Treasurer, Rufus I. Worrell, Mead Sales Company.

#### SPECIALTY PAPER AND BOARD AFFILIATES

President, Paul R. Bachman, Riegel Paper Corporation.

Vice-President, Harry S. Lewis, J. P. Lewis Company.

Secretary-Treasurer, G. D. Cook.

Executive Committee: Paul R. Bachman; Harry S. Lewis; W. B. Sheehan, Missisquoi Corporation; S. B. Sutphin, Beveridge Paper Company; L. E. Vose, Hollingsworth & Vose Company.

#### SULPHITE PAPER MANUFACTURERS ASSOCIATION

General Chairman, LeRoy F. Porter, Northwest Paper Company.

Vice-Chairman Bleached Group, Fred W. Cole.

Vice-Chairman Unbleached Group, George Stuhler.

Vice-Chairman Manilas Group, Rufus L. Sisson, Jr.

Vice-Chairman Machined Glazed Group, Edgar W. Kiefer.

Board of Governors: John E. Alexander; Martin A. Brown; Walter B. Merlin; Harold O. Nichols; John Stevens, Jr.; Rufus I. Worrell; and Officers. Secretary-Treasurer, Thomas J. Burke.

#### TISSUE ASSOCIATION

President, J. M. Conway, Hoberg Paper Mills. Vice-President, Dwight G. W. Hollister, APW Paper Company.

Treasurer: Sam Wishnick, Park Tissue Mills, Inc. Board of Governors: B. F. Picola, Gotham Tissue Corporation; R. B. Stevens, Stevens & Thompson Paper Company; B. I. Reider, Victoria Paper Mills; Sam Lopin, Hudson Pulp and Paper Corporation; W. Servotte, Bay West Paper Company; J. L. Ober, Scott Paper Company; R. W. Sweet, Sweet Brothers Paper Company; W. E. McIntyre, McIntyre Brothers Paper Company; H. Larsen, Crystal Tissue Company; W. Shafer, Jr., Flower City Tissue Mills, and E. W. Kiefer, Port Huron Sulphite Paper Company, and the officers.

Executive Secretary, Ross A. Fife.

#### U. S. PULP PRODUCERS ASSOCIATION

Executive Director, Oliver M. Porter.

#### WRITING PAPER MANUFACTURERS ASSOCIATION

President, A. C. Gilbert, Gilbert Paper Company.

Vice-Presidents, J. D. Zink, Strathmore Paper Company, and H. H. Hanson, W. C. Hamilton & Sons.

Executive Secretary and Treasurer, M. C. Dobrow. Executive Committee: Chairman, A. C. Gilbert, Gilbert Paper Company; H. R. Baldwin, Hammermill Paper Company; M. D. Bardeen, Lee Paper Company; G. H. Beckett, Beckett Paper Company; D. D. Coffin, C. H. Dexter & Sons; Bruce Crane,

Crane & Co., Inc.; G. B. Fowler, Valley Paper Company; W. J. Garrity, Munising Paper Company; T. A. Hendry, Mead Corporation; G. P. Lee, Parker-Young Company; R. S. Madden, American Writing Paper Corporation; E. A. Oberweiser, Fox River Paper Corporation; F. H. Savage, International Paper Company; W. B. Zimmerman, Maxwell Paper Company; J. D. Zink, Strathmore Paper Company, and H. H. Hanson, W. C. Hamilton & Sons.

#### Associate Members

The following are associate members:

##### AMERICAN WAXED PAPER ASSOCIATION

Executive Secretary, George J. Lincoln, Jr.

##### GLAZED AND FANCY PAPER ASSOCIATION

President, Harry B. Conklin, Louis Dejonge & Co.

Vice-Presidents, Leo R. McDevitt, Blackstone Glazed Paper Company and George J. E. Buell, Charles W. Williams & Co., Inc.

Executive Director, Arthur A. Thomas.

Executive Committee: Harry B. Conklin; Leo R. McDevitt; George J. E. Buell; Alfred C. Anders, Bradner Smith & Co.; John Hazen, Hazen Paper Company; Francis C. Heywood, The Marvellum Company and Charles Matthias, Matthias Paper Corporation.

#### Affiliate Members

The following are affiliate members:

##### AMERICAN PULP AND PAPER MILLS SUPERINTENDENTS ASSOCIATION, INC.

President, Arthur B. C. Drew, Somerset Pulp and Paper Company.

1st Vice-President, Oscar Stamets, Riegel Paper Corporation.

2nd Vice-President, Grover Keeth, Marathon Paper Mills Company.

3rd Vice-President, Lester S. McCurdy, National Paper Products Company.

4th Vice-President, Stanford C. Blankinship.

5th Vice-President, Ray L. Barton, Michigan Paper Company.

Finance Committee: Fred C. Boyce; William H. Brydges, Bedford Pulp and Paper Company and Killey E. Terry, S. D. Warren Company.

Secretary-Treasurer, Robert L. Eminger.

Field Secretary, George W. Craigie.

##### PULP AND PAPER TRAFFIC LEAGUE

President, F. E. Hufford, Castenea Paper Company.

Vice-President, T. H. Weatherdon, J. R. Booth, Ltd.

Secretary-Treasurer, H. R. Paul, Masonite Corporation.

Directors: F. F. Kator, Mead Corporation; W. J. Bailey, West Virginia Pulp and Paper Company; J. O. McKerrrow, Abitibi Power and Paper Company, Ltd.; J. E. Bryan, Wisconsin Paper and Pulp



Manufacturers Traffic Association; A. A. Raphael, New England Pulp and Paper Traffic Association; C. E. Jones, International Paper Company; O. J. McSwain, Albemarle Paper Manufacturing Company; R. J. Henderson, Minnesota & Ontario Paper Company and H. Ignatius, International Paper Co.

#### SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY

President, J. R. Diggs, Mosinee Paper Mills Co. Vice-President, (Chicago) C. H. Reeves, Allied Paper Mills.

Assistant Vice-President, (Chicago) B. B. Fisher, Bergstrom Paper Company.

Vice-President, (New York) J. D. Johnston, Gaylord Container Corporation.

Assistant Vice-President, (New York) H. A. Stone, Jr., Riegel Paper Corporation.

Secretary-Treasurer, Dr. E. O. Merchant.

Executive Committee: J. R. Diggs, G. K. Gibson, A. J. Ericsson, J. D. Johnston, L. H. Sisson, H. A. Stone, Jr., C. H. Reeves, B. B. Fisher, A. B. Helfrich and E. W. Tinker.

Advisory Board: G. K. Gibson, J. L. Fearing, J. H. Coy, S. C. Knott, H. R. Knott, W. L. Raymond, C. W. Whiting, E. R. Lyman, R. C. Johnson, J. T. Burruss and H. N. Phillips.

Membership Committee: National Chairman, G. K. Gibson, Mosinee Paper Mills; Western Chairman, F. X. Meiners, Filer Fibre Company; Eastern Chairman, E. F. Miles, Crocker-McElwain Company.

Educational Committee: National Chairman, A. J. Ericsson, Riegel Paper Corporation; Eastern Chairman, S. O. Styles, Martine Cantine Company; Western Chairman, J. T. Burruss, Albemarle Paper Manufacturing Company.

Social Committee: National Chairman, A. B. Helfrich, St. Regis Paper Company; Western Chairman, B. K. Babbitt, Brown Company; Eastern Chairman, Louis Chable, Jr.

Miami Valley Committee: Chairman, L. H. Sisson, Racquette River Paper Company.

#### TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY

President, W. H. Swanson, Kimberly-Clark Corporation.

Vice-President, R. A. Hayward, Kalamazoo Vegetable Parchment Company.

Secretary-Treasurer, R. G. Macdonald.

Executive Committee: W. H. Swanson; R. A. Hayward; R. G. Macdonald; L. C. Anderson, Ontario Paper Company, Ltd.; G. S. Brazeau, Weyerhaeuser Timber Company; G. W. E. Nicholson, Southern Kraft Corporation, B. M. Thomas, American Coating Mills; V. P. Edwardes, International Paper Company; F. D. Libby, Kalamazoo Vegetable Parchment Company; R. C. Griffin, Arthur D. Little, Inc.; H. H. Harrison, Crystal Tissue Company; Albert Bankus, Crown Zellerbach Corporation; G. Lamont Bidwell, Jr., Riegel Paper Corporation; M. P. Chaplin, Chaplin Corporation and J. L. Parsons, Hammermill Paper Company.

#### News Print Service Bureau

The News Print Service Bureau is an independent association. Its officers are as follows:

President, A. L. Hobson, St. Croix Paper Company.

Secretary-Treasurer, R. S. Kellogg.

## Watermarks in Papers

Watermarks in paper are among the oldest brand or trade names and have been influential in establishing the practice of branding many other products with the identification marks and designs of the producers. The single word "company" watermarked in the paper manufactured by William Rittenhouse in his mill on Paper Mill Run rivulet, Germantown, Pa., in 1692, was the first watermark used in the American Colonies. Later on this pioneer American paper maker used other designs for identifying his product. William Bradford, the first public printer, and a part owner in the Rittenhouse paper mill, printed nearly all of his publications on Rittenhouse papers. For more than a century the watermark of the Rittenhouse mill remained a clover leaf.

Benjamin Franklin's private watermark included

the "fleur de lis" and appeared in the paper used in printing Poor Richard's Almanac in 1748. This paper, however, was produced in 1747 at the Anthony Newhouse paper mills on Trout Run, Miquon, Pa., and was watermarked "Pro Patria."

Research conducted by James F. Magee, Jr., of Philadelphia, well known watermark expert, reveals that between the year 1690 and the Revolutionary War, twenty-five paper mills were erected in southeastern Pennsylvania.

To these few early watermarks a long list of watermarks and brands have been added down the years. In the current edition of "Lockwood's Directory of the Paper and Allied Trades" a comprehensive list of over 15,000 representative trade marks and brands are given.

## Paper Trade Journal

The PAPER TRADE JOURNAL was established at 14 Park Place, New York City, May 27, 1872, by Howard Lockwood. The first editor was Charles F. Wingate, who served in that capacity until July 15, 1875. The paper was first issued as a semi-monthly on the 1st and 15th of the month, but was changed to a weekly with the first issue in 1876.

On the first page, which was 18 1/4 x 23 3/4 inches, of the first issue, was printed the more important news and other matter including an article on the "Tariff on Paper, Books, &c." "The Sanitary Authorities and Importation of Rags," Manufacturing News, Incorporations, etc. On the second or editorial page, in addition to the editorial matter, appeared a prospectus by Howard Lockwood explaining the needs of a trade journal in the paper field and outlining the purposes of the PAPER TRADE JOURNAL.

The price of the paper was ten cents per copy which price has always been maintained. The JOURNAL filled a need and it prospered from the start. It was encouraged by the members of the industry both in the way of subscriptions and advertisements.

From 14 Park Place, the office was removed to 36 Beekman street, then directly in the heart of the paper district, but the growth of the business soon caused a removal to 74 Duane street. In 1883 larger quarters were again sought at 126-128 Duane street and cramped quarters necessarily led to the removal in 1895 to the corner of Bleeker street and West Broadway. Howard Lockwood died November 4, 1892, and the business was carried on by his widow under the style of the Lockwood Publishing Company. She became president and was later married to C. A. Alers-Hankey who became treasurer of the company and Colin K. Urquhart became secretary and managing director and editor.

The paper was purchased in 1899 by Colonel C. H. Jones who moved the business to 150 Nassau street and continued the business under the style of the Lockwood Trade Journal Company. Colonel Jones was prominent in national politics and was one of the best trained newspaper men in the country. He had for some time been associated with Joseph Pulitzer in the publication of the New York World, of which he was managing editor. He was induced by Mr. Pulitzer to go to St. Louis to become editor and general manager of the Post-Dispatch, which position he held until 1896. When he bought the PAPER TRADE JOURNAL in the Spring of 1899, he made his brother, George W. Jones, manager, although

he gave the journal much personal attention at first and continued as careful supervision as his health would permit until his death in 1913.

In 1916 Henry J. Berger became editor of PAPER TRADE JOURNAL.

After the death of Colonel Jones, all of the common stock in the Lockwood Trade Journal Company, representing a one half interest, was acquired by Leslie R. Palmer, a banker and lawyer. The Jones estate retained the other half interest in the business.

Mr. Palmer moved the offices to 10 East 39th street to accommodate the growing business. While the paper prospered under his management, Mr. Palmer preferred to confine himself more completely to banking and real estate, in which he was a large operator, and this influenced him in February, 1923, to dispose of his interest in the business to George S. Macdonald, who became vice-president and treasurer.

Mr. Macdonald, a widely experienced publisher, took a deep interest in the publication which soon manifested itself in many improvements, although he has always assiduously avoided making any revolutionary changes which would radically alter the character of the paper.

In February of 1925 the technical publication called Paper was acquired and consolidated with the PAPER TRADE JOURNAL. In July, 1928, Mr. Macdonald acquired by purchase the half interest in the property held by the Jones Estate and became president of the Lockwood Trade Journal Company. In 1932 the paper was moved to the present offices at 15 West 47th street.

The officers of the company are: George S. Macdonald, president; Arthur E. Gordon, executive vice-president; Joseph P. Horgan, secretary; George E. Lockwood, treasurer.

The editors of PAPER TRADE JOURNAL are Henry J. Berger, editor, and Stillman Taylor, associate editor.

Lockwood's Directory of the Paper and Allied Trades was started in 1873 to supplement the work of the PAPER TRADE JOURNAL. The first two volumes were issued bi-annually, but since 1876 the Directory has been issued annually until the present time. The first volume contained 212 pages as compared to 1298 in the present 1941 issue.

The directory has not only grown constantly in size during the years from the first edition until now, but has also constantly increased the service which it has rendered the industry.



HOWARD LOCKWOOD



C. K. URQUHART

H. J. BERGER

MRS. C. ALERS-HANKEY

C. H. JONES

L. R. PALMER

G. S. MACDONALD



## Albemarle Paper Manufacturing Co. Richmond, Va.

In 1887, A. B. Thaw interested Richmond capital in starting a paper mill, and organized a company under the name of the Albemarle Paper Manufacturing Company. A mill was built between the Canal and the James River. This site was chosen because of the fine water supply offered by the Canal both for water power and for use in manufacturing. Captain J. S. Chalmers was elected president and A. B. Thaw, secretary and manager. In 1907, H. W. Ellerson, its present president, was called to take charge of the company and it has greatly expanded and prospered under his management.

### Equipped With 88 inch Fourdrinier

The mill was known as Hollywood Mill and was equipped with an 88 inch Fourdrinier machine for the making of newsprint and manila papers. However, in 1888, production was switched over to Blotting, Matrix, Filter, and other absorptive papers, and the necessary additional equipment added.

### Only One Day Shift Required

Only one day shift was employed because it was not believed that the best paper could be made by artificial light, nor was it necessary to meet the demand. However, in 1908, when the mill was shut down for repairs and got behind in shipments, overtime was necessary and it was proved that night running could be done successfully. A year or two later with the beginning of the era of wide expansion and great competition in business, bringing with it great activity in advertising, there was a large in-

crease in demand for blotting paper and the mill began continuous twenty-four hour operation.

### Recognized As Among Best

The Hollywood Mill now has a capacity of 45,000 pounds of blotting paper per day. Its papers are recognized as among the best made anywhere in the world and are shipped to every state in the Union as well as many foreign countries.

### Picturesque Setting

Probably no mill in America has a more picturesquely historical setting than the Hollywood Mill of the Albemarle Paper Manufacturing Company of Richmond, Virginia. It is situated on the banks of the James River between the river and the old James River and Kanawha Canal. George Washington took an active part in the engineering of this Canal and was president of the company that built and operated it.

### Great Expansion

Since its early beginning the company has expanded a great deal. Since 1919 it has owned and operated another mill in Richmond known as Brown's Island, in which it makes about 110 tons of kraft paper per day. In 1937 it bought the Halifax Paper Company at Roanoke Rapids, N. C., and it makes in this plant an additional 35 tons of kraft paper per day as well as the majority of the kraft pulp necessary for its Brown's Island Mill.



BROWN'S ISLAND MILL



ALBEMARLE PAPER MFG. CO.

HOLLYWOOD AND RIVERSIDE MILLS

## The Beckett Paper Co., Hamilton, Ohio

The Beckett Paper Company was established in 1848 at Hamilton, Ohio. It is the oldest industry in Hamilton and is believed to be the oldest paper mill west of the Allegheny Mountains. The founders were Calvin Reilly, an investor, of Toledo, Ohio, and Adam Laurie, a young paper maker from Glasgow, Scotland. At that time, Hamilton was a village of 2,000 population and Cincinnati, with its 100,000 population, was the foremost city of the West. Calvin Reilly came to Hamilton in search of a place for investment. There was no railroad, but the Miami and Erie canal provided transportation and there was hydraulic power. These facilities had already attracted cotton, woolen and saw mills, and influenced Mr. Reilly to purchase lands on which the Beckett Paper Company has ever since been located, and contracted for water power.

The situation seemed favorable for paper making. There was an abundance of pure water and the great market of Cincinnati was at hand. Mr. Reilly knew nothing of the manufacture of paper, but he was able to employ as his superintendent Adam Laurie, a practical paper maker who also possessed considerable business ability. Under the terms of his employment, Mr. Laurie was to supervise the construction of the mill and operate it when completed. But before the work had progressed beyond the foundations, Mr. Reilly failed and left Mr. Laurie stranded. In this emergency Adam Laurie turned to William Beckett, a young lawyer who had begun to speculate in Hamilton real estate, particularly in industrial sites with hydraulic power facilities. Mr. Laurie had prepared a prospectus showing that the proposed paper mill could be built complete for \$12,000. The daily cost of operation was estimated at \$155.63. It was proposed to make 2,000 pounds of printing paper daily, valued at \$182.50. On an operating schedule of 280 days a year an aggregate net profit of \$5,027.60 was anticipated, or earnings of \$17.92 for each working day. These representations interested William Beckett and he gave up his law practice for the paper business and various other promotional activities. The mill was completed at a cost of \$12,000 and has been operated on the same site and under the same family control for over 92 years.

At the death of William Beckett, his son, William, took charge of the mill. It prospered and the Beckett Paper Company made the paper for the majority of the 122,000,000 McGuffey Readers printed before 1901. At the outbreak of the Civil War in 1861, William Beckett entered into a contract with the Cincinnati *Commercial Gazette* to furnish all the printing paper that newspaper required. This was estimated to represent about one-fourth of the capacity of the mill. At the start of the conflict, the circulation of the *Commercial Gazette* increased greatly and at the same time the cost of rags doubled and trebled until

rags finally reached a price of nine and one-half cents per pound, which was the exact price paid for the finished paper.

Efforts were made to secure release from the disastrous contract without success, when the resourcefulness of Adam Laurie conceived the plan of de-inking and pulping old newspapers as basic stock. This proved acceptable to the customer and the Beckett business was kept solvent. The de-inking process used was not perfected as it is today and sometimes a word or two from the old stock would appear in the morning newspaper. This led the proprietor of the *Commercial Gazette* to write to the Beckett mill that he was glad to get the paper, but preferred to do his own printing.

Thomas Beckett, the real founder of the Becketts of today, came into the business in 1876 at the age of sixteen years. He worked in every department of the mill to familiarize himself with the entire business and resolved to modernize the plant and to seek wider markets. Gradually the management passed into his hands and he proved competent. Before 1890 he had torn down, rebuilt and reequipped the entire establishment.

One of the important contributions of Thomas Beckett was the creation of Buckeye Cover about the year 1894. Prior to that date S. & S.C. cover, such as was used on every almanac and railroad circular, was the only cover available. Working in cooperation with the late James White, the Chicago paper merchant, Thomas Beckett conceived and developed a line of color antique cover papers of superior strength and appearance. This was one of the earliest cover papers and has had many imitators. In its enlarged and modernized form Buckeye cover papers continue to form the best known Beckett line.

Until the World Conflict the Beckett Company made immense quantities of writing and bond papers, largely under the private brands of paper merchants. Changing conditions led to the development of a program of proprietary lines covering the principal needs of the printing trade. In the order of their development these lines include Buckeye Text, Beckett Cover, Beckett Text, Beckett Offset, Ohio Cover, Tweed Text, Beckett Brilliant White Opaque. In addition, many special greeting and announcement lines are made, together with a variety of envelope and other special papers. The regular Beckett lines now include cover papers in three grades, text papers in three grades and offset papers in a great variety of weights, finishes and colors.

The advertising of Beckett papers began about 1908.

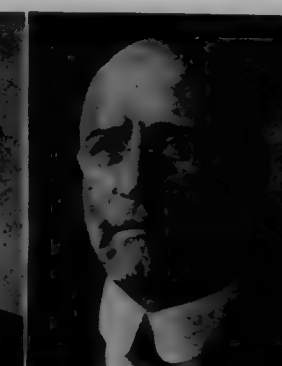
The present officers of the company are: chairman of the board, B. R. Millikin; president, M. M. Beckett; vice-president, Guy H. Beckett; treasurer, William Beckett; secretary, C. R. Greer. These officers, together with Dan Beckett, Don W. Fitton and Valentine Friedrich, Jr., constitute the board of directors.



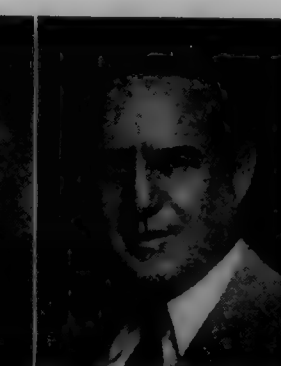
THE BECKETT PAPER CO., HAMILTON, OHIO, 1940



WILLIAM BECKETT



THOMAS BECKETT



GUY H. BECKETT



## Brightwater Paper Co. Adams, Mass

The history of this company as a paper manufacturer began in 1904 under the name of the Berkshire Hills Paper Company. The mill continued to manufacture under this management until 1928. In April of that year the mill was purchased by the Eaton Paper Company, a new corporation owned and operated by the Eaton, Crane & Pike Company and Henry J. Guild, who had long been connected with the paper industry. Under Mr. Guild's supervision as General Manager, \$500,000 was expended on additions and improvements to the plant, developing a modern and efficient mill.

### Changed Hands in 1933

In 1933 the plant again changed hands when it was purchased and organized as the Brightwater Paper Company, the principal owners being Henry J. Guild and Robert R. Young, who in 1937 also bought into and became Chairman of the Board of the Alleghany Corporation. Mr. Guild became President and General Manager and Mr. Young became a director in which capacity he continues to maintain an active part in the management of the company.

### At Peak of Efficiency

In its new regime under Mr. Guild's presidency, the Brightwater Paper Company was brought to its

full peak of efficiency; further expenditure being made annually for purposes of modernization, efficiency, and improved quality of the product. In 1939 more than \$140,000 was spent in new plant facilities. The mill, up to date now in every way, makes a special point of the purity of its Artesian Well Water which, of course, is reflected in the brilliancy of its paper.



HENRY J. GUILD

### The Brightwater Line

The Brightwater Paper Company makes machine dried, air dried and pole dried papers, embracing rag and sulphite bonds, rag and sulphite ledgers, weddings, bristols, papeteries, impregnating papers and other specialties. One of its specialty lines is Brightwater Delible Bond, the original easy erasing paper. This is a patented paper on which typewritten matter can be erased cleanly and quickly without destroying the surface.

### The Officers

The present officers are:

Henry J. Guild, president.  
George W. Verow, vice president.  
Harold M. Rice, treasurer.  
Frank D. White, secretary.  
Dorothy H. Rice, assistant secretary.  
Leon E. Maglathlin, sales manager.



BRIGHTWATER PAPER CO.

## Martin Cantine Co., Saugerties, N. Y.

The Martin Cantine Company was established in 1888 at Saugerties, N. Y. The founder, Martin Cantine, began his business career at the age of fifteen carrying mail for the old Sheffield Company of Saugerties, famous manufacturers of blank books. Before he was eighteen Martin Cantine had become Sheffield's star salesman of paper, books and printing. The field appeared most attractive to him. Martin Cantine had seen the tendency to blur in printed reproductions of halftones and he knew the fine screen halftones of that period were not practical because the ink seemed to spread. He reasoned that this defect could not be due entirely to the ink, but must largely be a paper problem. His fertile mind suggested a remedy. Why not apply some white film to the surface of the paper which would provide a better base for printing and so overcome the limitations of halftone printing?

The old Adams Card Company, of Albany, N. Y. was using a coating process for the production of lithographed playing cards. Martin Cantine visited the Adams plant and found that the mill was coating cardboard with clay, using hand labor and brushing on the coating on sheets as large as 14 by 28 inches. Hand work was too slow a method for Martin Cantine but the process was good. Before long Mr. Cantine purchased the Adams Card Company and proceeded to put his ideas into practice. He erected a mill on the high rocky land north of the Esopus, near the Saugerties bridge. The best workmen were brought from Albany. Henry Dickhaut was hired as superintendent and by the end of 1888 Martin Cantine's mill was producing two tons of coated paper daily.

Martin Cantine was a man who made friends easily and kept them. He possessed the assets of integrity and consideration for others in his business transactions. He quickly won the confidence of paper merchants and printers of his time, and never lost it. The paper produced by the Martin Cantine Company not only met existing needs but also opened up new fields for printers and advertisers.

To Holly R. Cantine, the present head of the company, personal credit is due for the broadening and improvements in the business that began in 1919. He started working at the mill in 1905, when he was 14 years old, during summer vacations from school. Subsequent vacations were spent in one department after another and gradually he learned to do the work of any man in the clay and color rooms, the coating room, the finishing room down to the shipping department. Then came a thorough grounding in the office, the study of accounts, credits, correspondence, investments, purchases and sales. Thus Holley R. Cantine mastered every detail of the business. With all

this he learned how to balance work with recreation. The impressive new Cantine Memorial Athletic Field of which Saugerties is justly proud, is an expression of Holley Cantine's conviction that, for everyone, life is meant to be enjoyed.

The foundation work of Martin Cantine has been solidly laid but it was for Holley R. Cantine to develop and improve the business. By 1920 he saw that the world had changed. Up to that time The Martin Cantine Company had been a manufacturing organization. Most of the papers

were private-branded and consumers rarely knew what paper they were using. It required time for a printer to check up all possible sources of supply. So, Holley Cantine planned how to introduce this improvement. In 1922 he was made general manager and put the plans into effect. Mill brand names were established, some papers were discontinued and others added to meet the growing needs of the graphic arts.

From the start, Henry Dickhaut proved a superintendent of unusual ability. There were no precedents to follow and he devised one improvement after another until the mill reached top efficiency and its products top quality. Henry Dickhaut's abilities were passed on to his son, Stephen, who joined the company ten years later and stayed until his retirement on pension, and to his grandson, Henry, who is carrying on his forbears' work today. Sales matters were delegated to William R. Crump, who with Messrs. Cantine, Dickhaut and Dedrick, comprised the "Big Four" of the original Cantine directorate. Mr. Crump from his office in New York became one of the large contributors to the success of the business. From the younger

men of the organization, he selected as his aide, Stanley O. Styles. After Mr. Crump's death Philip C. Batzle became the aide of Mr. Styles. "Stan" and "Phil" have been in joint charge of the New York sales office for twelve years. Norman Kimball in the East, Edmund Skinner in the West and James J. Forsythe in Chicago, have made sales records by following the principles established by Mr. Crump.

James Dedrick, assumed charge in the office in January of the first year and became secretary when the company was incorporated. Lew Fellows entered the company as office boy in 1906. He became secretary when Mr. Dedrick became treasurer and treasurer in 1922 when Mr. Dedrick retired. Fred Fonda, assistant secretary since 1916, followed through and became secretary of the company when Mr. Fellows, now in the prime of life, was elected to the office of treasurer.

The present officers of the company are: Holley R. Cantine, president; Lewis F. Fellows, treasurer; Fred Fonda, secretary.



PLANT OF THE MARTIN CANTINE CO.



MARTIN CANTINE HOLLEY R. CANTINE LEWIS F. FELLOWS FRED FONDA



## The Chesapeake Corp., West Point, Va.

The Chesapeake Corp. was established in 1913 at West Point, Va. A group of men from Cincinnati, Ohio, interested in banking and papermaking, after investigating many sites with a view of erecting a sulphate pulp mill, decided to locate at West Point, in King William County, Virginia. The Chesapeake Pulp and Paper Company was organized, and a mill was built on the Pamunkey River, about a mile from where this river joins the Mattaponi to form the York and approximately 39 miles east of Richmond.

The mill began operations on May 16, 1914, with a capacity of about 15 tons of pulp a day. In 1917 a cylinder board machine was added to the plant, and by 1918 the maximum capacity of the pulp mill was increased to approximately 23 tons daily. In November, 1918, a group of industrialists took over the Chesapeake Pulp and Paper Company, and reorganized it under the name of the Chesapeake Corporation.

The management of the mill was placed by the new owners under the supervision of Elis Olsson, who has been identified with the sulphate industry practically as long as it has existed on this continent. It is only natural that a man so closely connected with the industry should have an opportunity to obtain a high grade staff to work with him, and that has been the case. Under the management of Mr. Olsson, the production of the mill was increased. By 1921 it was producing approximately 33 tons of board and 46 tons of pulp per day.

The purchases and sales were placed in the hands of W. C. Gouldman, secretary of the company, who had been closely connected with the Chesapeake Pulp and Paper Company's sales organization since its beginning.

There were some changes in the official personnel of the company between 1918 and 1921, as the controlling block of stock in the company changed hands several times, but Mr. Olsson remained general manager and Mr. Gouldman secretary and sales manager, and each of them continued to be a member of the board of directors.

In 1921, the Albemarle Paper Manufacturing Company of Richmond, Va., was the largest purchaser of pulp from the Chesapeake Corporation. Some gentlemen connected with that company decided to buy the controlling interest of the Chesapeake Corporation, and Mr. Olsson was then elected vice-president as well as general manager. H. W. Ellerson,

president of the Albemarle Paper Manufacturing Company, became president of the Chesapeake Corporation, and J. Scott Parrish of Richmond, a director of the Albemarle Paper Manufacturing Company, became treasurer of the Chesapeake Corporation. Mr. Gouldman remained as secretary. As directors of the company, besides the above named officers, T. Croxton Gordon and Julien H. Hill of Richmond and W. H. Hotchkiss of New York, who was president of the Chesapeake Corporation at the time the Richmond men purchased the controlling interest, were elected. Mr. Hotchkiss resigned in 1922, and the affairs of the corporation were thence directed by the six remaining gentlemen.

The beginning of the great expansion in the sulphate industry in the southern states of the United States, as well as in Sweden and Finland, caused Mr. Olsson some anxiety about the future of the industry. It looked as if, temporarily, at least, the competition would result in very low prices and certainly make it impossible for a pulp mill to survive, if it had to ship out practically all its pulp. It therefore seemed desirable that a finishing plant or paperboard mill should be erected adjacent to the pulp mill to convert the pulp into a finished product.

It also seemed fair that the Albemarle Paper Manufacturing Company, which had been if any, of such an undertaking, therefore, the Albemarle-Chesapeake Company, Inc., was formed in 1928, with the Albemarle Paper Manufacturing Company and the Chesapeake Corporation as owners of the new company, with the directors of the two companies serving on the board.

In December 1938 the Chesapeake Corporation bought out the interests of the Albemarle Paper Manufacturing Company in Albemarle-Chesapeake Company, Inc., and on August 10, 1940, Albemarle-Chesapeake Company, Inc., was consolidated by a merger into the Chesapeake Corporation. The entire operation is now carried on by the Chesapeake Corporation, with officers as follows: Elis Olsson, president; H. W. Ellerson, vice-president; J. Scott Parrish, treasurer; W. C. Gouldman, secretary; Miss Elizabeth S. Gray, assistant secretary. There are seven members of the board of directors as follows: Elis Olsson, H. W. Ellerson, J. Scott Parrish, W. C. Gouldman, T. Croxton Gordon, Julien H. Hill and Overton D. Dennis.



Fairchild Aerial Surveys Inc.  
CHESAPEAKE CORP.



W. C. GOULDMAN J. SCOTT PARRISH T. CROXTON GORDON ELIS OLSSON  
H. W. ELLERSON OVERTON D. DENNIS JULIEN H. HILL

## Consolidated Water Power & Paper Co.

The Consolidated Water Power & Paper Company was organized under the laws of the State of Wisconsin July 28, 1894, under the corporate title "Consolidated Water Power Company" for the purpose of consolidating several small water powers on the Wisconsin River at Grand Rapids and Centralia (now Wisconsin Rapids). On November 10, 1902, the stockholders passed a resolution amending the articles of incorporation, broadening its purposes to include the manufacture of paper and changing the name to Consolidated Water Power & Paper Company.

The paper mill at Wisconsin Rapids was constructed in 1903 and 1904. The paper mill at Biron was acquired on September 5, 1911, from the Grand Rapids Pulp and Paper Company by giving stock in exchange for its assets and assuming its liabilities. These two mills purchased their requirements of sulphite pulp until November 1, 1916, at which time the Appleton sulphite mill was acquired through the purchase of the Interlake Pulp and Paper Company, which was later merged with the parent company.

On July 1, 1918, the Oneida Paper Company was organized as a subsidiary for the purpose of acquiring a water power site owned by the Jackson Milling Company at Stevens Point, and construction of the Stevens Point hydro-electric properties was started that year. On November 8, 1919, the name was changed to Oneida Power Company, and its purpose changed to a public utility. On April 1, 1926, this company acquired the hydro-electric properties at Wisconsin Rapids and Biron from the parent company and the corporate title was changed to Consolidated Water Power Company. The Stevens Point paper mill was constructed in 1919. Waxing, tissue, and creping papers were manufactured from sulphite pulp furnished by the Appleton mill. The first union agreement was entered into with the International Brotherhood of Paper Makers (American Federation of Labor) on May 17, 1919.

The Interlake Pulp and Paper Company owned stock in Newaygo Company, Ltd. and in Newaygo Tug Line, Inc., the former owning tracts of exportable spruce in the vicinity of Port Arthur, Ontario, and the latter, floating equipment for the transportation of pulpwood in rafts. Large quantities of spruce pulpwood were required in the operations of these mills and as the supply was diminishing in this section of the United States the balance of the stock of these two companies was purchased in 1920 in order to secure a portion of the spruce requirements from Canada. During the period from 1920 to 1923 the manufacturing facilities of Wisconsin Rapids and Biron mills were substantially increased. A sulphite mill at Wisconsin Rapids and new hydro-electric plants at Wisconsin Rapids and Biron were included in this expansion program. A large area of

exportable spruce in the District of Algoma, Ontario, was purchased on April 10, 1924, from the Algoma Central and Hudson Bay Railway Company. This purchase was primarily for the purpose of assuring an adequate supply of spruce pulpwood for the Appleton mill. This tract is owned and operated by Newaygo Timber Company, Ltd.

Experiments were made in 1933 with a new and revolutionary process for coating paper on the paper machine during the process of manufacture. Formerly coating was applied to the finished paper in a separate operation. The controlling interests in the patents for this process were acquired December 3, 1933. A coating machine designed with the improvements resulting from experiments was built and installed on No. 4 machine at Wisconsin Rapids. This machine started producing coated paper in January 1935. This process was licensed to manufactures in foreign countries. In 1935 a coating machine was installed at Stevens Point which resulted in the successful development of coated waxing paper for bread wrapping. After these coated papers were perfected additional facilities were required to meet the demand for these papers. Additional coating machines were installed at all of the paper mills and a modern new paper machine equipped for this coating process was installed at Wisconsin Rapids mill. Other units were enlarged to meet the requirements of this increased capacity. This construction program is being completed in 1940.

George W. Mead, president and general manager of the company, has been a director and general manager since November 10, 1902. He supervised the construction of the original mill at Wisconsin Rapids, and has been the principal executive officer of the company through its many years of successful operation. Associated with George W. Mead in the management of this company are his two sons, Stanton W. Mead and Walter L. Mead. The former has been connected with this concern since 1922, has been a director since January 26, 1927, and holds the position of vice-president and treasurer, and director of manufacturing. Walter L. Mead has been with the company since 1926, and has been a director since January 26, 1927, and is now vice-president and director of sales. E. B. Redford, a former banker, became associated with the company in 1916, and has served as secretary and principal financial officer for many years. He has been a director since January 26, 1927. Theodore W. Braseau, an attorney, has been a director since January 21, 1920, and has acted as chief counsel for the corporation from the time it started operations.

Consolidated paper brands are stocked and distributed by over one hundred wholesale paper corporations located in important cities all over the nation.

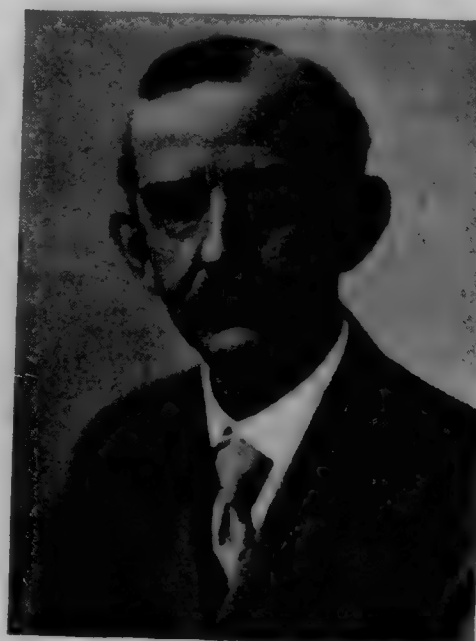




## Crane & Co., Dalton, Mass.

Crane & Co. was established by Zenas Crane who built the first mill at Dalton, Mass., in 1801. The original deed for the mill site was given by Martin Chamberlain to Henry Wiswall, Zenas Crane and Daniel Gilbert. The land was bought for \$194. Members of the Crane family had been connected with three paper mills before the Dalton mill was erected. The first mill supplied currency paper for the American Colonies. The ledger of this mill, known as the Liberty Mill, shows entries of purchases of currency paper by Paul Revere who engraved currency for the colonies. Another early Crane mill was built by Stephen Crane, elder brother of Zenas Crane, at Newton Lower Falls. Zenas Crane learned the papermaking trade from his brother Stephen. He was superintendent of the Burbank Mill at Worcester, from 1799 to 1801, when he came to Dalton at the age of 21 in search of a site for a new mill.

The mill was erected at Dalton as a one vat mill, and was on the site of what is now the Old Berkshire Mill. It consisted of two floors, the upper one being used as a drying loft. The mill had a daily capacity of twenty posts, a post consisting of 125 sheets of folio or cap size, making 100 to 125 pounds of paper. The employees included an engineer at \$3 a week and a vatman and coucher at \$3.50 a week. The layboy was paid 60 cents a week and board. The compensation of Zenas Crane a few years later as superintendent and general manager, was \$9 a week. In 1809, another mill was built at Dalton on land owned by Martin Chamberlain, on the site of the present Pioneer Mill. On April 6, 1810, Zenas Crane bought a third interest in a new mill, which later was known



W. MURRAY CRANE

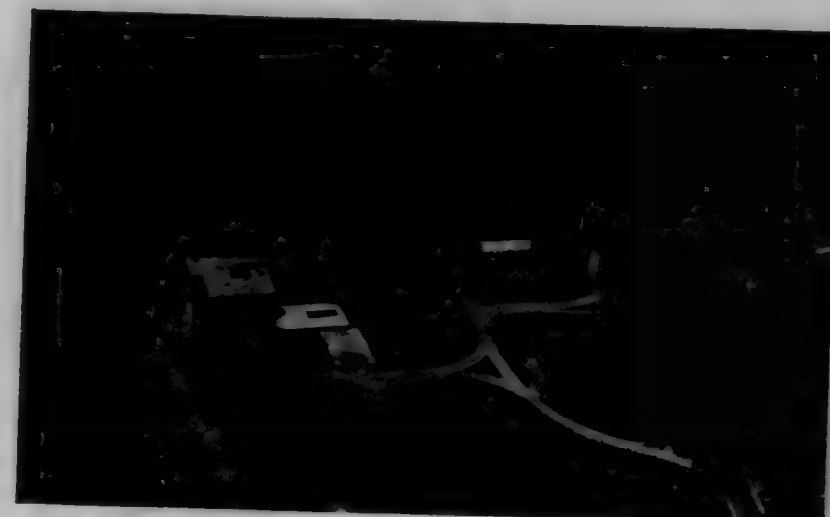
as the Old Red Mill. In 1822, he became sole owner of it.

In 1831, a cylinder machine, made by James Ames of Springfield, was installed and in 1834 cylinder dryers were added. The date of the first Fourdrinier machine is not known but it was probably installed a few years later than 1840. Zenas Crane died in 1845, having in 1842 transferred the business to his sons, Zenas Marshall and James B., who continued the business as Crane & Company. A stone mill was built in 1844 near the then standing Old Red Mill, which was destroyed by fire in that year. In 1879, Crane & Company purchased the Colt Mill in Coltsville, in which bank note paper for United States currency was made. In 1893, a new brick mill was built to replace the old stone Pioneer Mill and several additions have since been added to it.

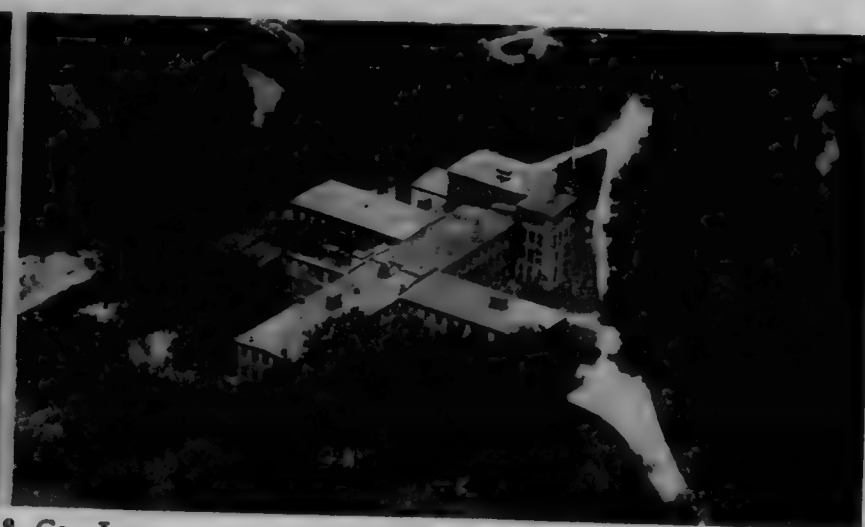
Zenas Marshall Crane is given credit for inventing an attachment to the Fourdrinier to regulate the even flow of pulp to obtain an even thickness of paper. The first mechanical layboy was also devised by him, as was the old, distinctive bank note paper, with parallel silk threads, which was first made in 1844 for a bank.

When Zenas Marshall Crane died in 1887, and James B. Crane in 1891, the business passed to Zenas Jr. Crane, Winthrop Murray Crane and Frederick G. Crane and subsequently to their sons and grandsons, who represent the fourth and fifth generations from Zenas Crane the pioneer paper maker.

The present officers of Crane & Company are: Winthrop M. Crane, Jr., president and general manager; Frederick G. Crane, vice-president; W. G. O'Connell, treasurer, and R. C. Pierce, secretary.

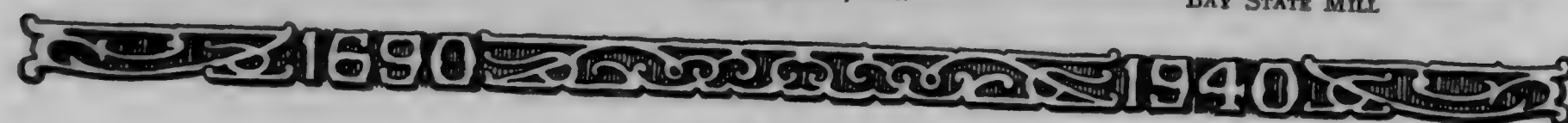


OLD BERKSHIRE MILL



CRANE & CO., INC.

BAY STATE MILL



## Crocker, Burbank & Co. Assn.

In 1826 Alvah Crocker bought a mill site in West Fitchburg and started the business since developed into the present Crocker, Burbank & Co. Assn. which operates eight mills with a daily output from eighteen machines of 350 tons of paper.

A fire which levelled Crocker's best mill in 1842 led to a partnership with Gardner S. Burbank and between 1842 and 1874 they acquired the Snow, Cascade, Upper, Hanna, Whitney, Lyon and Stone mills. In 1855 Mr. Crocker's son, Charles T. Crocker came into the firm. The Snow mill, taken over in 1862, was built in 1839 by S. S. Crocker and sold to Benjamin Snow, Jr., in 1847 and he, with Samuel Whitney, turned the mill over to Crocker Burbank after fifteen years of operation. The Cascade mill, bought in 1863, was built about 1842 and first owned by S. S. Wheeler, George Brown and Joel Davis and later by E. P. Tileston, Jonathan Ware and Franklin Wyman who, in turn, sold out to Crocker Burbank. The Upper mill, now known as the Brick mill, built in 1851 by Alvah Crocker and Edwin Upton came into the Crocker Burbank group in 1859. The Hanna mill, built in 1852 by George and Joseph Brown, passed into the hands of Samuel Hanna who disposed of it to Crocker Burbank in 1860. The Whitney mill in Rockville, twice bought by the firm, was built in 1847 by Whitney and Bogart who sold it to Crocker Burbank, later bought by Samuel Whitney and William Baldwin, Jr., and finally reacquired by Crocker Burbank in 1868. The Lyon mill, built in 1853 by Moses G. and B. F. Lyon, was sold to Crocker Burbank in 1869. The Stone mill, built for S. A. Wheeler and Joel Ames who jointly owned a half interest and Alvah Crocker, owning the other half, was acquired by Crocker in 1864 who sold it to the Crocker Burbank firm in 1871.

At the time of Alvah Crocker's death in 1874 these seven mills had a daily output of seventeen tons of paper. Between 1876 and 1909 the company operated as a private partnership and among those partners were: Charles T. Crocker, Samuel E. Crocker, George F. Fay, Alvah Crocker, George H. Crocker, Edward S. Crocker and C. T. Crocker, Jr. In 1909 the partnership merged into Crocker, Burbank & Co., Inc.; three years later it became Crocker, Burbank & Co., Inc.; three years later it became Crocker, Burbank & Co., Inc., a Massachusetts corporation, and the Wachusett Realty Trust. C. T. Crocker, Sr., died in 1911. On June 30, 1917, Crocker, Burbank and the

Trust company were merged into the present form of Crocker, Burbank & Co. Assn.

The entire output of Crocker, Burbank & Co. Assn. clears through two sales outlets—Linton Bros. & Co. and Crocker Burbank Papers, Inc., both with Fitchburg headquarters. Founded in 1865, Linton Brothers started in Pawtucket with a small converting mill featuring the production of bristol board. Around the turn of the century Crocker Burbank commenced producing bristol by a simpler process. In 1912 Norman Harrower joined the Crocker Burbank organization and a year later bought a partnership in the Linton firm. In 1915 when the second Linton brother died Mr. Harrower, president of the firm moved it to Fitchburg and in 1928 it purchased the office building formerly used by the Parkhill Mill on Rollstone street. In 1939 Crocker Burbank Papers, Inc., was organized as sales agency for the company's book and converting manufacture, superseding Clark & Co., of New York City.

At the time this history is being written in 1940 the officers of Crocker, Burbank & Co. Assn. are: Charles T. Crocker, president and treasurer; Douglas Crocker, vice president, assistant treasurer and secretary; Bigelow Crocker, vice president and assistant treasurer; C. T. Crocker, 3rd vice president and assistant treasurer; Norman Harrower, vice president; Ralph M. Beckwith, vice president.

More than one thousand men and women are employed at wages aggregating more than one and one-half million dollars annually.

From its founding in 1826 by Alvah Crocker the control of the company has been consistently in the hands of Crockers. Crocker Field in Fitchburg, one of the finest athletic fields in America, was donated by Alvah Crocker, a grandson of the founder.

The first Alvah Crocker was born in North Leominster in 1801, the son of a pioneer paper maker. Alvah was eight years old when he went to work in a paper mill receiving twenty-five cents for a twelve hour day. In 1820 he left his home in Leominster and found work in a paper mill in Franklin, New Hampshire, where he remained until 1823 when he secured employment with General Leonard Burbank said to be the first paper maker in Fitchburg. After three years with the General young Crocker launched his first independent venture; laboring in his mill by day and driving his team to Boston at night with its load of finished printing and writing paper.

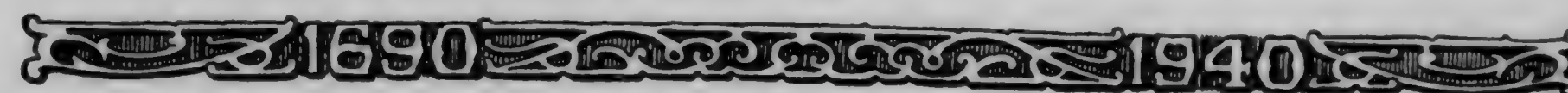
## Bergstrom Paper Company, Neenah, Wisc.

The Bergstrom Paper Company of Neenah, Wisconsin, organized by D. W. Bergstrom, S. H. Bergstrom and J. N. Bergstrom took over the Winnebago Paper Mills in 1904 from D. R. and W. L. Davis.

In 1912 a new mill was added for the production of white book paper and in 1919 another paper ma-

chine and auxiliary equipment were added and the original mill dismantled.

Numberless improvements have been made during the succeeding years by which the plant has kept pace with the developing technique of producing white book.





## P. H. Glatfelter Co., Spring Grove, Pa.

One hundred and seventy-five years ago the pioneer iron bloomery west of the Susquehanna was in operation at Spring Forge, Pa., supplying materials for the Continental Army when the British were in control of the eastern part of the colonies.

The bloomery, under the direction of the old iron master Daniel Shireman, continued until 1851 when Jacob Hauer bought and converted the forge buildings into a paper mill.

Twelve years later, a few days after President Lincoln passed through Spring Forge on his way to make his historic address in 1863 at Gettysburg 20 miles away, P. H. Glatfelter, who had been working in a paper mill in Maryland, bought the property from Mr. Hauer and established the Spring Forge Mill. Operation was not begun, however, until July 1864.

The capacity of the mill was 1500 lbs. daily, made on one 50 inch machine. In 1874 the mill was moved to its present site and an 82 inch machine and speedier auxiliary equipment were added, bringing the production to about 8,000 lbs. daily.

The product of the early mill was newsprint made from rye straw. The company owned large large box-cars, known as "barns," which were sent out over the railroad to pick up the straw and waste from cotton gins.

The mill continued to grow and by 1890 had installed the largest and fastest machine in existence, 102 inches. George W. Childs, of the *Philadelphia Public Ledger*, had pioneered the world's largest Hoe presses and he founded the mill at what had now become Spring Grove (incorporated 1882) the only one capable of supplying the required 94 inch rolls.

The first pulp mill to make pulp from pine as well

as poplar wood by the soda process was built. Because of this, and with the addition of other equipment in 1895, the product was changed to book papers, bonds, writings, mimeographs, tablet and lithograph papers, with a daily capacity of 110,000 pounds.

With the completion in 1922 of again the world's largest fine paper machine 170 inches the paper capacity became 200,000 lbs. per day and 75,000 lbs. of pulp. The modernization program at this time was carried out by the second Glatfelter generation under the active direction of President W. L. Glatfelter.

His son, P. H. Glatfelter, began taking active charge in the early twenties and immediately set up a long range expansion program that was to double the output of the mill of both pulp and paper. The program entailed an expenditure of some \$2,000,000.

On the death of his father, in 1930, P. H. Glatfelter became president.

Mr. Glatfelter had launched his ten year modernization program in 1928 beginning with the installation again of one of the largest fine paper machines, 190 inches. This increased the productive capacity to 300,000 lbs. Though at times during the depression years it seemed it might be wise to delay some of the projects, they were confidently carried forward as scheduled.

All obsolete equipment has been replaced; many thousands of feet of floor area have been added to house modern air conditioned finishing and stock rooms, the latest type of pulverized coal burning high pressure boilers, complete new beater rooms, and an entirely remodelled pulp mill with doubled capacity. The pulp mill carried a \$750,000 investment with the old equipment completely replaced.



P. H. GLATFELTER



P. H. GLATFELTER CO., SPRING GROVE, PA.

## Crown Zellerbach Corp., San Francisco, Cal.

The Crown Zellerbach Corporation was established in San Francisco, Cal., in 1918 with the merger of the Crown Willamette Paper Company and the Zellerbach Corporation.

The Crown Willamette Paper Company was founded in 1877, when the mill of the California Paper Company was started at Stockton, California, manufacturing newsprint and coarse varieties of paper from rags and straw, the latter being obtained from wheat growing ranches in that vicinity. William Pierce Johnson, late chairman of the board of Crown Willamette Paper Company, assumed management of the Stockton enterprise in 1882. A material change was made in paper manufacturing in the '80s, when wood began

to be used as the raw material for newsprint and wrapping paper pulps, replacing rags and straw. The new wood-pulp competition from the East soon forced the California Paper Company out of business; this resulted in Mr. Johnson and his associates organizing in 1889 the Willamette Pulp and Paper Company for the manufacture of newsprint at Oregon City, Oregon, where an abundance of the necessary pulpwood and power for grinding were available.

In connection with this operation, a pulp mill was founded on Youngs River, near Astoria, Oregon. At that time logging was done with oxen. Pulp from this mill was awarded a bronze medal at the World's Columbian Exposition held in Chicago in 1893. In 1885 a group from Portland, Oregon, formed the Columbia River Paper Company to construct a newsprint and coarse wrapping paper mill at Camas, Washington, on the north shore of the Columbia River, 15 miles east of Portland, Oregon.

About the same time the Crown Paper Company at Oregon City, Oregon, was formed. This company operated a paper bag factory at San Francisco until the San Francisco fire in 1906. It was in this factory that Louis Bloch went to work tying up bundles of bags.

The Lebanon Paper Company, formed in 1892 for the production of wrapping paper, was located on the Santiam River, at Lebanon, Oregon. In 1899, the interests controlling Crown Paper Company organized Floriston Pulp and Paper Company in the high Sierras, at Floriston, California, for the manufacture of wrapping and tissue papers. The mill began operation in June, 1900.

What is now the Western Transportation Company had an interesting history in serving the pulp and paper industry in Oregon. The Western Transportation & Towing Company was established in 1902, and with tugs and barges served the Crown Columbia Pulp and Paper Corporation on the Columbia River. The Willamette Navigation Com-

pany was established in 1912, and with a fleet of tugs and barges served the Willamette Pulp and Paper Company on the Willamette River.

Many enterprises formed the background for the Crown Willamette Paper Company. A series of mergers began in 1905 when Crown Paper Company and the Columbia River Paper Company were merged as the Crown Columbia Pulp and Paper Company. In 1912 the Crown Columbia Pulp and Paper Company absorbed the Floriston Pulp and Paper Company and the corporate name was changed to Crown Columbia Paper Company. Then in 1914 the Crown Columbia Paper Company and the Lebanon Paper Company were merged with the Willamette Pulp and Paper Company to form the Crown Willamette Paper Company.

This series of mergers brought a number of newsprint, coarse wrapping papers and tissue mills under one operation. In 1915 the Crown Willamette Company was formed, as a subsidiary to itself, Pacific Mills, Limited, at Ocean Falls, B. C. Development of power, construction of mills and creation of a town followed under personal supervision of A. B. Martin, now executive vice-president. Other subsidiaries of Crown Willamette Paper Company were Pacific Coast Supply Company, Western Waxed Paper Company, Canadian Crown Willamette Company, Ltd., Santiam Power Company, Sierra Flume Company, Western Paper and Bag Company and Pioneer Fruit Wrapper and Paper Company.

Through this long period of upbuilding Louis Bloch took a leading part. Speaking recently at a banquet honoring his 45 years of continuous activity with Crown Zellerbach Corporation and predecessor companies Mr. Bloch told of his advent to the paper business, saying: "The Crown Paper Company acquired a bag factory in San Francisco from one of its customers who had failed, and at seven o'clock one morning in March, 1894, I walked into that factory, donned a pair of overalls and thus made my debut into the paper business." Mr. Bloch is chairman of the board of Crown Zellerbach Corporation.

Turning now to the Zellerbach group of companies, we find listed in the San Francisco Directory of 1868 as a "merchant" the name of Anthony Zellerbach, father of I. Zellerbach (chairman of the executive committee and father of J. D. Zellerbach, president of Crown Zellerbach Corporation). It appears, however, that Mr. Anthony Zellerbach's first contact with the paper business was in 1870.

I. Zellerbach joined the business in 1888. Subsequently branches were established at Los Angeles, Oakland, Port-



CHAIRMAN LOUIS BLOCH IS PRESENTED WITH HISTORIC PAPERWEIGHT



I. ZELLERBACH

J. D. ZELLERBACH

R. A. McDONALD

H. L. ZELLERBACH

A. BANKUS

W. P. JOHNSON





land, Seattle, Salt Lake City and other Pacific Coast towns. Until 1914 Zellerbach Paper Company was strictly a merchandising business handling all kinds of paper and paper products. In 1914 the first venture was made in manufacturing. National Paper Products Company was formed for the conversion in San Francisco of paper towels and toilet tissues, and later a mill was built at Stockton for the manufacture of solid fiber and corrugated packing cases and cardboard cartons. The next step was acquisition of a plant at Carthage, New York, where towels and toilet tissues were manufactured and converted for the eastern market. Another manufacturing venture was undertaken in 1919 by organization of Washington Pulp and Paper Corporation with mills at Port Angeles for the production of newsprint. In 1927 Fibreboard Products, Inc., was formed for the purpose of merging several coast board mills and converting plants, the controlling interest of which is jointly owned by Paraffine Companies, Inc., and Crown Zellerbach Corporation.

In the photograph at the top of page —, Louis Bloch, chairman of the Crown Zellerbach Corporation, is shown at the right receiving a bronze paperweight from Otto Erickson, made from a piece of the old-type digester of the West Linn Mill that had passed through a fire. The photograph was taken last August when Mr. Erickson visited San Francisco to receive from Mr. Bloch a 50-year diamond service pin. Mr. Erickson entered the service of a predecessor company at West Linn, Ore., on August 15, 1889, as a carpenter, later becoming a millwright and serving in that capacity until he voluntarily retired in October, 1940.

Construction was started on the National Paper Products plant at Port Townsend, Washington, in the fall of 1927. The first unit of this plant, which manufactures kraft board, was put into operation in the fall of 1928, and the second unit in May of 1929, manufacturing kraft paper.

The Zellerbach Corporation came into existence in 1924 as a holding company to consolidate the various Zellerbach interests and activities. Its subsidiaries at that time included Zellerbach Paper Company, Washington Pulp and Paper Corporation, National Paper Products Company and the Sanitary Products Corporation, a jobbing and distributing organization for eastern territory, and the American Investment and Realty Co.

In 1928 the merger arrangements led to the creation of Crown Zellerbach Corporation. By an exchange of stock the new corporation became the owner of all of the common stock of Crown Willamette Paper Company with its subsidiaries. More than half a century of unbroken business relations between these two institutions preceded this merging of interests.

Today, Crown Zellerbach Corporation has an annual producing capacity of 550,000 tons of paper, and partly-owned

board mills have an annual capacity of 225,000 tons of boxboard and boxboard products.

There are approximately 20,000 stockholders. Nearly ten thousand employees are enrolled in the Crown Zellerbach Corporation and partly-owned board mills with in excess of 4900 of the employees wearing continuous service emblems ranging from five to fifty years.

The Crown Zellerbach Corporation expends about \$11,000,000 annually on the Pacific coast for supplies other than pulp timber and machinery. These supplies range from oil, lime rock, salt cake and sulphur to wool from thousands of sheep necessary in the manufacture of paper machine felts. While predecessor companies pioneered both research and good forest practices many years ago, Crown Zellerbach Corporation officials today emphasize these elements as being increasingly important. Recently the corporation constructed and modernized, at Camas, Washington, one of the most central research laboratories and technical departments in the pulp and paper field.

Within the past several months the corporation has attracted to its forest management department Eric J. F. Brandstrom, who for many years has been forest economist at Portland, Oregon, for the United States forest service. Along with experienced operating officials who have years of experience in forest management, Mr. Brandstrom will apply the results of his long study of perpetual yield to the corporation's vast timber holdings in order that there will be a complete independence of pulpwood supply for many years.

Officers of Crown Zellerbach Corporation are: chairman of the board, Louis Bloch; chairman of the executive committee, I. Zellerbach; president, J. D. Zellerbach; executive vice-president, A. B. Martin; executive vice-president, R. A. McDonald; executive vice-president, H. L. Zellerbach; vice-president and treasurer, Thos. McLaren; vice-president, A. Bankus; vice-president, J. Y. Baruh; vice-president, D. S. Denman; vice-president, A. B. Lowenstein; vice-president, F. N. Youngman; secretary, D. J. Goldsmith; controller, A. L. Bennett; director of industrial relations, A. R. Heron. Directors of Crown Zellerbach Corporation are: J. Y. Baruh of Los Angeles and M. M. Baruh, Louis Bloch, Charles R. Blyth, Herbert Fleishacker, A. F. Martin, R. A. McDonald, Thos. McLaren, E. M. Mills, J. H. Schwabacher, G. S. Towne, H. L. Zellerbach, I. Zellerbach, J. D. Zellerbach of San Francisco.

Members of the executive committee are: Louis Bloch, A. B. Martin, R. A. McDonald, Thos. McLaren, H. L. Zellerbach, I. Zellerbach, J. D. Zellerbach.

Crown Zellerbach products comprise a very large line of paper and paper products including newsprint, sulphite papers, wrapping and toilet tissues, bags, kraft and sulphite liner boards, towels, waxing sulphite, waxing tissue and many other standard and specialty items.

## French Paper Co., Niles, Mich.

The French Paper Company was established in 1871 at the time a dam was constructed across the St. Joseph River at Niles, Michigan. In 1872 six grinders were running by direct connection to water wheels producing ground-wood pulp from the silver poplar wood prevalent in the adjacent territory.

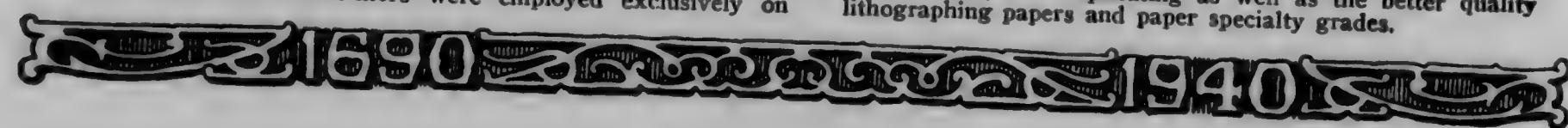
By 1881 the firm was known as the Michigan Wood Pulp Company with J. W. French, the founder as President. That year a 72-inch six cylinder board machine was installed. With a production of only 7500 pounds in twenty-four hours this was reputed to be the largest per machine board production west of the Alleghany Mountains. Between 1893 and 1895 two Fourdrinier machines were added to produce newsprint. By 1904 when the firm name was changed to French Paper Company the Fourdriniers were employed exclusively on

book papers.

The founder, J. W. French, died in 1907 and was succeeded by his son, J. Edward French, who continued as President until his death in 1931. For eight brief months thereafter another son of the founder, F. J. French, served as President until his death.

Since 1931, a grandson of J. W. French and son of J. Edward French, Frank G. French, has been President, with H. O. Parker as Vice-President and Treasurer, and L. F. Kretschman as Secretary.

The progress in grades of paper has been from the early ground-wood pulp, wood-pulp board, newsprint, book papers, and today the production is entirely such business papers as bond, ledger, and duplicating as well as the better quality lithographing papers and paper specialty grades.



## The Crystal Tissue Co., Middletown, Ohio

The Crystal Tissue Co. was established in 1827, near Middletown, Ohio. From a beginning in 1827 as a water-power saw-mill to the present modern tissue mill is a growth that could be found only in a progressive country such as we live in. Because of the abundant water power supplied by the Miami and Erie Canal, Adam Dickey, in 1827, started a saw mill on the site now occupied by the Crystal Tissue Company. As the country became more settled, the demand for lumber decreased and the establishment of farms created a new demand and the saw mill was converted into a flour mill. The operation of the flour mill continued almost without interruption until 1886 when it was converted into a strawboard paper mill, still using as raw material the product of the local farmers.

The first operation of the Crystal mill as a maker of tissues came a few years later when Dr. Thornton, principal of a high school in Cincinnati, Ohio, took charge of the plant and began the manufacture of light weight papers. This venture was not successful and the mill was closed for several years until in 1894 it was reopened by J. W. Van Dyke and operated by him as the Crystal Paper Company. In 1894, occurred on of those industrial revolutions that destroy the old and create new ideas, methods and products. This was the introduction of the packaging of foods. The wrapping of crackers and cookies in wax paper created a demand for this type of paper that the Crystal Paper Company under Van Dyke filled. Right then began the growth of the Crystal mill to its present place in the tissue and waxed paper industry.

In 1902 Mr. Van Dyke, now president of the Atlantic Refining Company of Philadelphia, Pa., who was in financial control of the Crystal Paper Company, prevailed upon D. E. Harlan to take over the management of the company. While Mr. Harlan had an engineering background, he was also widely experienced in management and selling, and this combination was a strong contributing factor in the success of the Crystal Paper Company under his direction.

When Mr. Harlan came to Middletown, he found the mill poorly equipped and poorly managed. The two machines, one a 60-inch Harper Fourdrinier, the other a 60-inch Cylinder that had been in use by the old strawboard company and later rebuilt to make tissue paper, were in a dilapidated condition. These two machines were all the equipment the plant had. The Harper Fourdrinier was being operated on 22 pound paper which was waxed to 30 pounds. The Cylinder was making light weight tissues.

Mr. Harlan quickly sized up the situation. His engineering mind told him the equipment would have to be changed. His experience in management told him that the personnel of the company would have to be reconstructed. The plant was shut down for eight months to make these changes. The Harper Fourdrinier was changed into a cylinder machine and the other paper machine was put in good mechanical condition. And from that day on, the Crystal Paper Company went ahead consistently year after year, constantly

adding to its equipment, its working force, and its output of tissue paper items. Its financial growth has kept pace. Its products are the standard of comparison wherever they are used. In 1905 the business had grown to such proportions that an 80-inch machine was added. In 1906 one of the old Cylinder machines was replaced with a 100-inch machine. A 100-inch machine was unheard of in the manufacture of



E. E. GRANT



L. J. LONG



E. A. CAHILL

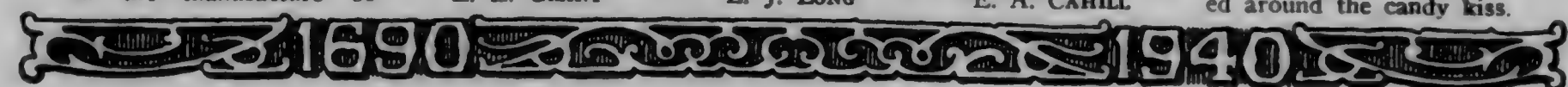
tissue paper. Mr. Harlan was ridiculed but his engineering training told him that the problem in building tissue paper machines was a problem of controlling vibration. When he tried to place the order with the paper machinery manufacturer for a 100-inch machine, the manufacturer emphatically refused to accept any responsibility for the performance of the machine. Mr. Harlan told the manufacturer to go ahead and build the machine as he specified it, and that he would take the responsibility for the outcome. The machine was built. It was installed and it was made to work. From that day the width of tissue paper machines has increased until today light weight tissue paper is made 168 inches wide.

The Crystal Paper Company was now operating three machines, a 60, an 80 and a 100-inch. But still this was not enough to take care of the rapidly growing business. The years 1911 and 1912 saw construction of a new mill and into this new mill went a 120-inch machine, the widest light weight Cylinder tissue paper machine in the world. Again a new use of tissue paper was making its demands. It was for tissue paper from which to make paper rugs or carpets for porches, summer homes and the like. Though known as fiber rugs, actually they are made of tissue paper, and much of the paper is made by the Crystal Tissue Company. The paper carpet industry uses large rolls of paper 60 inches wide. So, the 120-inch machine would turn out two 60-inch rolls. It took well into 1912 to get the various paper machinery manufacturers to turn out the necessary parts for a 120-inch machine. And again the company went through a very trying experience before the machine actually was satisfactory.

The effect of this development on the costs of Crystal products was tremendous. It permitted the company to reach out steadily after business in fields that were previously unable to afford tissue paper. And it permitted Crystal to meet anyone on price in the high quality range of tissues. Crystal has kept constantly after the problems of making better tissue at less cost. For instance, it used to take twelve girls to count the tissue that is put up in ream packages. A ream is 480 sheets. But Crystal was among the first to install a machine which lays out the tissue in the required number of sheets, so that the girls have only to count the units instead of the single sheets.

In 1920 occurred a new epoch in the history of the Crystal Company. When Harlan was manager of the Lima Steel Casting Company of Lima, Ohio, back in 1900, Z. W. Ranck was his pattern boy, and general office boy. When Mr. Harlan came to Middletown to manage the Crystal Paper Company he sent for Mr. Ranck to be his bookkeeper. When Mr. Harlan retired in 1920, he made it possible for Mr. Ranck to take over the management of the company he had served so long and faithfully. During those years Mr. Ranck had equipped himself to take over this leadership. Not only did he know how things were to be done, but he had actually done them himself.

Mr. Ranck organized the present Crystal Tissue Company on July 1, 1920, and took over the active management. Soon after he took charge, the use of waxing paper took a new turn. Manufacturers began using more waxed paper to wrap candy kisses. Special machinery had been invented to do the wrapping. This required a special sheet that would feed through wrapping machines rapidly and would not tear when it was automatically twisted around the candy kiss.







The technical department of the Crystal Tissue Company, as in many other instances, worked with the manufacturers and developed a special sheet for this purpose. Another important market for Crystal products was opened and to take care of this business another 120-inch machine was installed, in 1923.

Still wider markets for tissue papers were developed during the years following 1923, necessitating expansion of the equipment of the Crystal mill. To keep ahead of this demand and to keep the mill up to date, many changes and additions were made. In 1927 a 100-inch Fourdrinier machine was installed and in 1930 a 120-inch Fourdrinier. These machines were designated as No. 6 and No. 7 and completed the complement of machines now in use, making tissues of all grades.

Additional paper-making machines have meant additional power needs, which have been amplified and improved almost yearly as more power was needed, using the most modern coal-handling, firing and energy producing equipment. In this same period a water softening plant was installed, and a new bleach house for the preparation of bleach liquor was built. In 1931 a new and modern office building was erected.

## Deerfield Glassine Co.

The mills of the Deerfield Glassine Company are located in Monroe Bridge, Massachusetts, on the Deerfield River, at a site where paper has been manufactured for over fifty years.

The original mill was built by the James Ramage Paper Company in 1887 and was operated on various grades of paper until 1927.

In 1927 the Deerfield Glassine Paper Company was formed under the active leadership of Joseph Wallace, the late prominent paper mill engineer and operator. A second fourdrinier paper machine was installed, a new supercalender room with five stacks of heavy duty glassine calenders were added, and the beater room was completely revamped and supplied with the special equipment used in beating glassine stock. The change over to a Glassine mill has required the expenditure of nearly one million dollars.

Associated with Mr. Wallace were a number of bankers and industrialists mostly from the middle west. These men are for the most part still associated with the company as directors with the active management resting in the hands of its president and treasurer, Paul E. Hodgdon, who is assisted by W. A. Wyld in production and sales, and Richard J. Doolin, assistant treasurer. Floyd Creek is superintendent.

A list of the officers and directors of the company since its formation in April 1927, follows:

President: Joseph H. Wallace, April 1927-July 1934; E. J. Costigan, July 1934-Feb. 1935; Paul E. Hodgdon, Feb. 1935-Present.



PLANT OF DEERFIELD GLASSINE CO.

During this expansion greater markets were being developed and a need was seen for a complete tissue converting mill. Consequently, in one of the buildings were installed modern high speed printing presses for printing gift wrapping tissues, interfolding machines for toilet papers, and a complete work room for the packaging of thousands of tissue paper items daily. Among these items are tissue rolls for Christmas and everyday gift packaging, manifold bond for printing and train-order tissues. Today the Crystal mill produces tissue papers in scores of grades and weights and does the complete job, from the pulp to the finished package ready to go to the ultimate consumer.

The company now has 201 employees and has carried group insurance since 1929, and this year at no cost to employees, the company has increased the group coverage 50 per cent.

In 1939 Mr. Ranck died and the group he trained assumed his responsibilities. E. E. Grant became president, L. J. Long, vice-president and general manager; Elizabeth A. Cahill, secretary and treasurer; V. H. Larsen, vice-president in charge of sales, and H. H. Harrison, vice-president in charge of manufacturing.

Vice-president: Wm. G. Shortess, April 1927-Nov. 1929; Ira J. Owens, Feb. 1929-Dec. 1929; Wm. C. Ross, Jan. 1930-Present; E. J. Costigan, Feb. 1935-Present.

Treasurer: Wm. L. Ross, April 1927-Feb. 1935; P. E. Hodgdon, Feb. 1935-Present.

Secretary: Frank E. Greenwood, April 1927-Jan. 1930; Joseph Poole, Feb. 1930-July 1934; Phil S. Dickinson, July 1934-Present.

Assistant Treasurer: J. A. Buell, April 1927-Nov. 1928; F. J. Bickerstaff, Nov. 1928-Aug. 1929; Ward M. Willets, Aug. 1929-Mar. 1930; Charles Scudder, July 1934-May 1936; R. J. Doolin, Feb. 1935-Present.

Assistant Secretary: Miss C. Fream, April 1927-July 1934; Max M. Mason, July 1934-Present; W. A. Wyld, Feb. 1935-Present.

Directors: Joseph H. Wallace, Apr. 1927-July 1934; Wm. G. Shortess, Apr. 1927-Nov. 1929; Wm. L. Ross, Apr. 1929-Present; E. J. Costigan, Sr., Apr. 1927-Present; Frank E. Greenwood, Apr. 1927-July 1930; Ira J. Owens, Feb. 1929-Dec. 1929; K. S. Dickinson, Feb. 1929-Present; Charles Scudder, Feb. 1929-Present; Joseph Poole, Nov. 1929-July 1934; George M. Seaman, July 1930-1936; Paul E. Hodgson, July 1930-Present; Phil S. Dickinson, July 1934-Present; Charles L. Kraft, July 1934-1939; Charles R. Stoddard, July 1935-May 1936; E. J. Costigan, Jr., Nov. 1939-Present; Earl M. Wyman, Apr., 1940-Present; Samuel C. Scudder, Apr. 1940-Present.



## Eastern Corp., Brewer, Maine

The Eastern Corporation, then Eastern Manufacturing Company, was incorporated in February 1889, at which time it commenced the manufacture of unbleached sulphite pulp in a newly constructed mill adjacent to a large tidewater saw mill in Brewer, Maine, owned by the incorporators—the Ayer family—its purpose being to convert the waste spruce saw mill slabs into pulp. The saw mill ownership, dating back to 1884, was transferred to the Eastern in 1904, and this business was operated by the company until 1916, when it was discontinued.

The acquisition of the saw mill property brought to the company a considerable acreage of timberlands to support its spruce wood requirements for pulp. At present extensive tracts of timberland are for this purpose owned or controlled in Eastern Maine and Nova Scotia.

Through the years the Brewer pulp mill was enlarged to its present capacity of 120 tons per day, and facilities provided for manufacture of the highest grades of bleached sulphite for paper making as well as dissolving pulps for rayon, plastics and nitrating. This mill was among the first to commercially produce suitable pulp for the manufacture of rayon silk yarn.

In 1896 the company built a one-machine paper mill adjacent to the Brewer pulp mill and commenced the conversion of a portion of its pulp into manilas and other coarse papers. In 1901 and 1902 two more paper machines were added, and the manufactured product changed from coarse to fine papers. The scope of the fine paper business at this mill was expanded in 1905 to include rag papers, a phase of the business which was continued until 1934. The present capacity of the Brewer paper mill is 100

tons per day of fine writing papers and paper specialties.

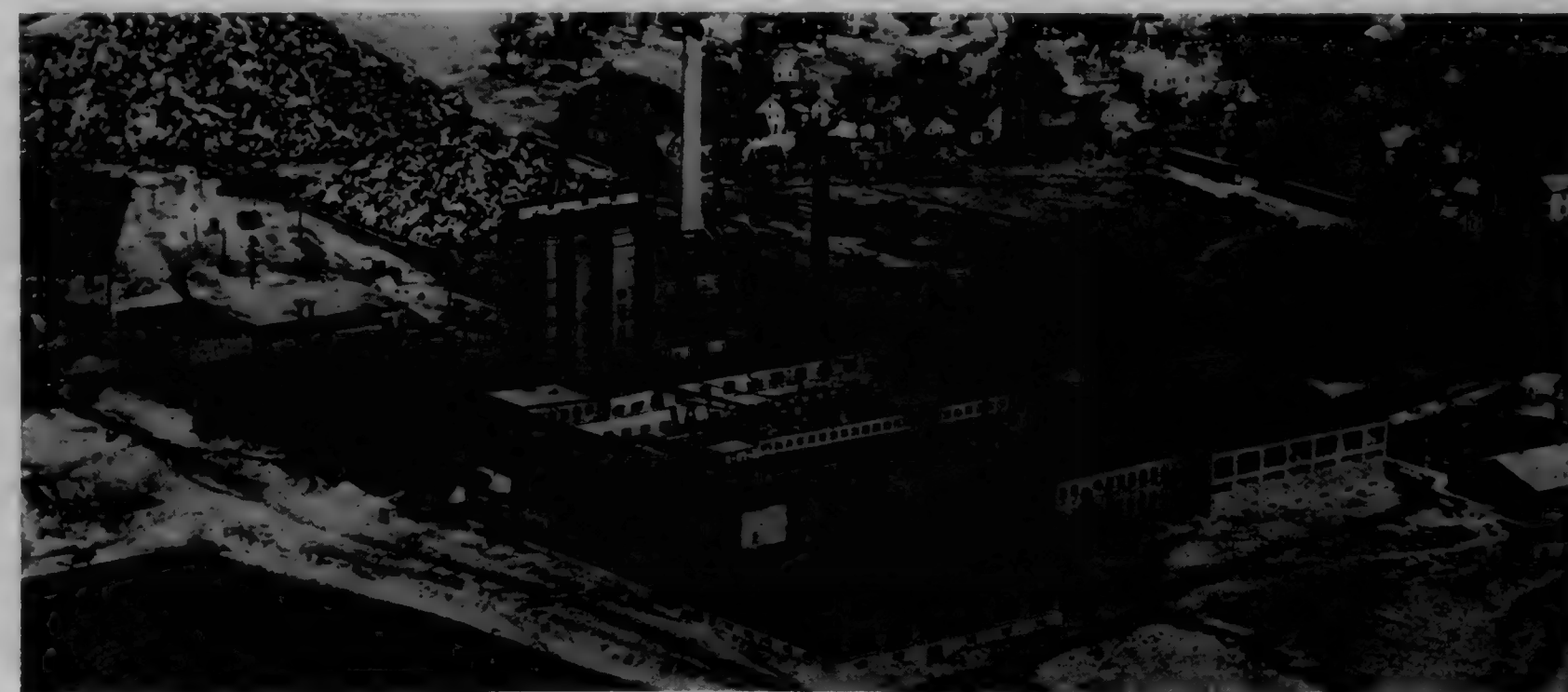
The Katahdin Pulp and Paper Company of Lincoln, Maine, was taken over in 1915 and has since been operated as a division of Eastern. These mills have been extensively rebuilt and modernized, producing at present 75 tons per day of bleached sulphite paper pulp and 50 tons per day of sulphite bond paper.

The Eastern Electro-Chemical Company was organized in 1916 and a plant built adjacent to the Brewer mill to produce bleach liquor for the pulp mills. This company was absorbed by Eastern in 1921.

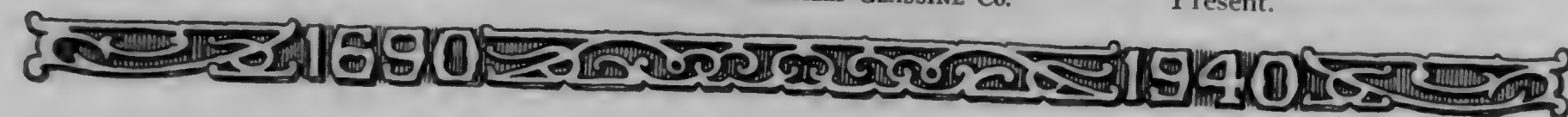
In 1930 the Orono Pulp & Paper Company at Basin Mills, Maine, was purchased, and at present the pulp mill is operated, producing 50 tons per day of unbleached sulphite pulp.

The general offices of the company are located at the Brewer Mill as well as general sales and advertising headquarters for the company's domestic and export paper and pulp business. Division sales offices for paper products are maintained in Boston, New York, Chicago, Washington and New Orleans.

The Paper Mills of Eastern produce a wide variety of fine business papers under the general brand name of "Eastco" which are sold through paper merchants throughout the country and at many foreign points. The company's leading mill brand paper is Atlantic Bond, a genuine water-marked sheet used for letterheads and business forms. The Atlantic line also includes Atlantic Ledger, Mimeo Bond, Duplicator, Cover, Duropake, Manuscript Cover, Manifold, Writing and Vellum. Another popular Eastco mill brand is the Manifest line.



MILL OF THE EASTERN CORPORATION





## Franklin Paper Co., Holyoke, Mass.

The Franklin Paper Company was established and incorporated under the laws of Massachusetts on Jan. 2, 1866, in Worcester, Mass., by Calvin Taft of that city, James H. Newton of Holyoke and E. Newell Taft of Northbridge. Mill and water rights were secured in Holyoke and manufacture started on a line of French folios, colored flats and envelope paper. Later a substantial and novel business was developed in the manufacture of paper for reversible collars, a forerunner to the rubber and celluloid collars.

Up to 1882, changes in the personnel included E. C. Taft, F. H. Chamberlin, E. W. Chapin and John Ramage, serving at different times as directors of the company. The death of Calvin Taft at this time terminated the Taft interests and James H. Newton became president with Ed. T. Newton and F. H. Chamberlin later becoming directors.

In 1892 the Company was purchased by the present management under the leadership of James Ramage. The paper machine was now changed from

Fourdrinier to cylinder and the production to that of tag boards, silk wrapping and duplex patent coated papers which gradually changed into the present lines of manufacture; White and colored mill bristols, index, sample card, post card, jewelry card, duplex, white blanks and cylinder specialties.

The present officers of the company are: George C. Watson, president and treasurer; James B. Ramage, vice-president; Arthur R. Ingham, assistant treasurer and Robert M. Swaney, secretary.

The products of the Franklin Paper Company are distributed by jobbers throughout the United States and Canada.

The lines of the company include, Jefferson Index, Beta Index, White and Colored Franklin Bristol, National Cream Post Card, Franklin Duplex Bristol, Franklin Inlaid Bristol, Victory Blanks and Franklin Special Blanks. These different grades are used for card indexes, posters, display cards and advertising: menus, photo mounts, sample cards for displaying worsted, woolen and fancy cotton goods, post cards, and other items.

## Esleeck Mfg. Co., Turners Falls, Mass.

The Esleeck Mfg. Co. was established at Turners Falls, Mass. In 1900 the late A. W. Esleeck purchased the Marshall Paper Company of Turners Falls. Mr. Esleeck was born in Texas of British (Welsh) ancestry, and spent a number of years in the paper industry in Holyoke before establishing his own business in Turners Falls.

Soon after the Marshall Paper Company was acquired, the name was changed to the Esleeck Manufacturing Company and that concern was the pioneer in the manufacture of rag content onion skin and manifold papers, which today are considered "the standard" throughout the United States.

The Esleeck Manufacturing Company is the only concern in the country specializing in rag content

onion skin, manifold and other thin typewriter papers. For more than 40 years their entire efforts have been concentrated in this one channel. Research in the study of thin paper requirements, plus special equipment particularly adapted for producing the grades they manufacture, enable the company to furnish paper of uniform quality, weight and finish.

Esleeck thin papers, owing to their light weight for typing and mailing, strength for erasing and handling, permanency for valuable data, also minimum bulk for filing are in demand for office and factory for records, forms, thin letterheads, copies, advertising literature, and for other uses.

The present officers are Irving N. Esleeck, president; F. R. Andrews, treasurer, and W. H. Wood, secretary.



ESLEECK MILL AT TURNERS FALLS, MASS.

## Great Northern Paper Co., Millinocket, Me.

The Great Northern Paper Company, now the largest newsprint producer in the United States, came into being in 1899, through the efforts of the late Garret Schenck, of Weston, Mass. One of the most prominent figures in the paper industry, Mr. Schenck, who learned the paper business in the Bird & Son mills at East Walpole, Mass., had up to that time been active in the building of paper mills, among others the mills at Great Works, Orono and Rumford, Maine.

Upon formation of the International Paper Company in 1898, Mr. Schenck sold his Maine properties to them and at once started promotion of a new and most ambitious newsprint project at Millinocket, Maine, on the Penobscot River. Associated with Mr. Schenck in this venture were Col. A. G. Paine, Col. Oliver Payne and William C. Whitney of New York, Col. Edward Haskell of Boston, Charles W. Mullen of Bangor, Maine, and others. The original company formed in 1898 was known as the Northern Development Company, the name being changed to Great Northern Paper Company early in 1899, when construction of the 8 machine mill at Millinocket was started. At that time the company was capitalized at \$5,000,000 and had acquired 260,000 acres of timberlands on the West Branch of the Penobscot River.

Before the Millinocket mill had been completed the Manufacturers Investment Company, which operated a mill at Appleton, Wis., and another at Madison, Maine, built about 1891, and of which Col. Oliver Payne was an officer and large stockholder, went into bankruptcy. The Madison property was promptly acquired by the new Great Northern Paper Company and was the first plant to be operated under its name, turning out at that time 55 tons of newsprint, 50 tons of sulphite pulp, and 40 tons of groundwood pulp per day.

The Millinocket mill started up on November 1, 1900, with a capacity of 240 tons of newsprint per day. Its building had involved the transportation into the Maine wilderness of thousands of tons of materials, and the building of roads, dams, and a town capable of housing some 2,000 people, in addition to the erection of mill buildings and the installation of machinery—a tremendous undertaking for those times. The work was carried out under the direction of Hardy S. Ferguson, still one of the foremost paper mill engineers in the country.

Expansion of the new company, fostered by the growing use of newsprint, was rapid. In 1907, another new mill, arranged for four paper machines, was built at East Millinocket, Maine, ten miles below the Millinocket plant. The construction of this plant, known as the "Lower Mill", involved the building of a dam to 25 foot head and a grinder

room and paper mill at "Burnt Land Rips" and a second dam to 50 foot head, with a grinder room and hydro-electric station at "Dolby Rips" about a mile above. The town of East Millinocket was developed around the paper mill site. The Lower Mill went into operation in August 1907, with three machines, producing 120 tons of newsprint per day. The fourth machine was added in 1913. Production of the Millinocket mill was also stepped up, and by 1910 the original eight machines were producing over 300 tons per day. Timberland holdings had been increased to keep step with the company's new output.

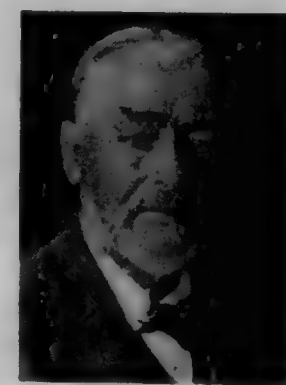
In November 1910, William A. Whitcomb came to the Great Northern Paper Company as general manager. Mr. Whitcomb had served his apprenticeship with the Glens Falls Paper Mill Company, and had been with the International Paper Company for twelve years, resigning his position as vice-president of that company to come to the Great Northern Paper Company.

During the early days of the company, sales of its product were handled by Col. A. G. Paine. In 1901 the sales managership was taken over by Wm. B. Dillon, who was succeeded in 1912 by W. C. Powers, now with Peter Dixon Company of London, England.

In 1914 the machine room at Millinocket was enlarged, and a ninth machine installed. This was the first paper machine to run at a speed of 1,000 feet per minute. In 1916, a similar machine, No. 10, was installed, bringing the production of the Millinocket Mill to 430 tons per day. The high speed at which these machines were operated was made possible by the inventions of Elmer Pope, which were worked out in the Great Northern Mills.

The company had in 1903 obtained charter for a subsidiary known as the West Branch Driving and Reservoir Dam Company, which took over the privileges of the old Penobscot Log Driving Company, in regard to driving wood and storing water on the West Branch of the Penobscot. In 1916 to protect its rapidly growing need for hydraulic power, the company built the Ripogenus dam at Ripogenus Gorge on the Penobscot. This dam was at that time the largest storage dam ever built by a private corporation for its own use.

The next ten years represented a period of consolidation, modernization and gradual progress. New timberlands were acquired, bringing the company's holdings to over 1,000,000 acres by 1926. Suction roll equipment was added to paper machines, the Millinocket sulphite mill was enlarged, and the original hydraulic turbines were replaced with modern units. The Millinocket boiler plant was modernized. The Madison water power was redeveloped on the Anson side of the river in 1923, five vertical hydraulic units being installed.



GARRET SCHENCK



WILLIAM A. WHITCOMB



GREAT NORTHERN PAPER CO., MILLINOCKET MILL.





In 1926 and 1927, two of the original paper machines, Nos. 7 and 8, were removed and replaced with higher speed equipment, to bring the Millinocket mill capacity to 650 tons. By modernization, the East Millinocket machines were at this time capable of turning out over 300 tons, and the Madison mill about 100 tons.

Garret Schenck died in January 1928, and was succeeded as president by Mr. Whitcomb, and Wm. O. McKay became manager of manufacture—the title of general manager being abolished. The sales manager's position had been taken over in 1919 by H. Merton Joyce, formerly treasurer of the company. H. Merton Joyce died in 1935, and was succeeded by A. R. Caspar, formerly assistant manager of manufacture. William Hilton succeeded Fred A. Gilbert as manager of the Spruce Wood Department in 1929.

The year 1928 marked the beginning of a new period in the company's development. In 1930, the Madison mill was converted to the manufacture of specialty papers. Between 1928 and 1934, the grinder room at Dolby was converted into a hydro-electric station; the old two-foot grinders at both Millinocket and East Millinocket were replaced by four-foot grinders of a new type designed by Mr. Whitcomb and now widely used throughout the industry; and in 1934 and 1935 a new power station, capable of developing 9300 hp. at 28 foot head was built at the existing dam at North Twin Lake, 5 miles above Millinocket. In 1936 a new concrete storage dam was built at Seboomook on the upper waters of the Penobscot River.

In 1937, construction of a new hydro-electric power station was started at Mattaceunk Rips, 10 miles below East Millinocket on the main Penobscot River. This station, containing three vertical units operating under 40 foot head, went into

## L. L. Brown Paper Co., Adams, Mass.

The L. L. Brown Paper Company was established in 1849 at Adams, Mass. The founders were Levi L. Brown and his uncles, Daniel and William Jenks, who formed a partnership known as L. L. Brown & Co. The present name of the company was adopted in 1873 at which time the partnership of the concern became a corporation. Levi L. Brown, one of the original founders, became president. T. A. Mole, who joined the company as bookkeeper in 1866, was made treasurer.

In addition to the founders, Levi L. Brown and Daniel and William Jenks, several men prominent in the industry have been associated with the company. Among them were James Osbourn, general superintendent, and E. W. Streeter, assistant superintendent, both of whom served under the administration of Mr. Brown; C. C. Jenks, who succeeded Mr. Brown as president in 1894; and Arthur B. Daniels, president from 1896 to 1938. Mr. Daniels, who was one of the best known and most highly esteemed figures in the industry, had been with the company since 1878. The present officers are A. Millard Daniels, president and secretary; and Rupert B. Daniels, treasurer.

The L. L. Brown Paper Company has always been among the most progressive in policies and methods. In fact, the L. L. Brown mills form an interesting study in contrasts. There one sees the same conscientious care and thoroughness which formed the nucleus of the enterprise 91 years ago flourishing alongside the most modern equipment and methods.

The company is proud of the fact that one of its present staff, Herbert E. Harrington, cashier, has worked with several of those who were instrumental in guiding the enterprise in its earlier days. Mr. Harrington has been identified with the L. L. Brown Paper Company since 1880.

The mill originally chosen for this enterprise consisted of a small brick and wooden structure which occupied part of the site of the present main plant of the company. The daily productive capacity was limited to 1000 pounds. This parent mill, however, was carefully and fully equipped according to the standards of the day. As with the present mills of the company, the original plant was geared for the production of quality exclusively.

service, with two units operating, in November, 1939. The third unit was added in the spring of 1940.

The company's production at the present time is in excess of 1100 tons per day of newsprint, specialties and mill wrapper, all sold east of the Mississippi River. It has holdings of more than 1,800,000 acres of timberlands and developed water powers of 107,000 hp., of which 100,000 hp. is on the Penobscot River within 20 miles of the Millinocket mill, backed up by storage of 56 billion cubic feet.

Many changes have taken place in the financial end of the company. Payne Whitney, a director for many years, died in 1927, and was succeeded on the board of directors by his son, John Hay Whitney. Commodore Lewis Cass Ledyard, and his son, Lewis Cass Ledyard, Jr., were both members of the executive committee, and directors for a long term of years, and had under their direction the company's financial management and business policies. Commodore Ledyard died in 1932. Mr. Lewis Cass Ledyard, Jr., died in 1936, and was succeeded by Williamson Pell, president of the United States Trust Company of New York, who is now directing the general business and financial management of the corporation.

The present directors are: William O. McKay, Eustis Paine, Williamson Pell, F. S. Rollins, Hilbert Van N. Schenck, Benjamin Strong, Sheldon E. Wardwell, William A. Whitcomb, John Hay Whitney.

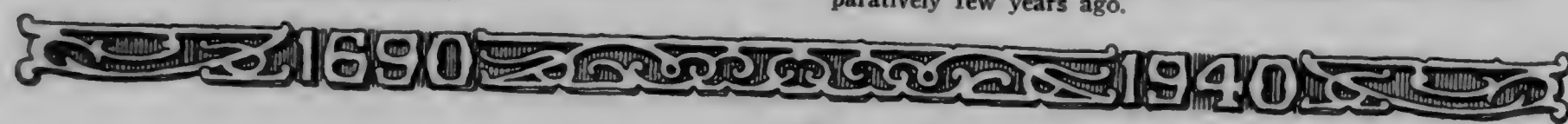
The officers, as at present, are: William A. Whitcomb, president; William O. McKay, vice-president and manager of manufacture; William Hilton, vice-president and manager Spruce Wood Department; A. R. Caspar, vice-president and manager of sales; Burt C. Ward, treasurer; Bryan L. Seelye, clerk.

The founders did not operate their mill long before they realized the value of quality, and much greater facilities were required. The partnership thereupon acquired a large cotton mill nearby which was at once remodelled for paper manufacture. A constantly widening appreciation of L. L. Brown papers made even the increased capacity inadequate. So, in 1871 the original mill in which L. L. Brown and his associates began operations was remodelled and much enlarged. Since then that mill, and the second unit, now known as the Upper Mill and the Lower Mill, have been steadily expanding to keep pace with market requirements and manufacturing progress. Today these mills are among the most modernly appointed manufacturing plants in the country.

The first materials which the concern purchased consisted of white linen and cotton rags. From that day on all L. L. Brown permanent papers have been made from none but white rags. The policy which prevails in the selection of rags characterizes the choice of all other raw materials also.

The L. L. Brown Paper Company, although it has always specialized in ledger papers, includes among its products other lines, notably linens, bonds, parchments, onion skins, exchange cap, manuscript covers and typewriter papers. Ever since the company was founded, however, chief emphasis has been on record papers, especially those which must endure for unlimited years or withstand extreme handling.

For many years the L. L. Brown Paper Company had the distinction of being the only mills to manufacture genuine, hand-made paper on a commercial basis. The paper was used for de-luxe editions, engraved and embossed cards and for other exclusive use. Long after machine-made paper had generally replaced the manually fabricated article, the L. L. Brown Paper Company continued to have calls for the latter. Having always been known as manufacturers of quality papers exclusively, the company continued to be looked to as the source of supply by those who felt that no paper could be genuine quality unless it was hand-made. To care for this demand, the company maintained a department for this purpose until a comparatively few years ago.



## Gulf States Paper Corp.—E-Z Opener Bag Co.

The Gulf States Paper Corporation was established in 1885. The history of the Gulf States Paper Corporation and the E-Z Opener Bag Company is almost the personal story of its founder, H. E. Westervelt, one of the grand old men of the paper business.

Perhaps the early "steps" can be best described in Mr. Westervelt's own words, quoted from a letter written in 1935, when the company published its "Fifty-one Years of Progress". Mr. Westervelt says: "My first experience in the paper business was in 1884 as salesman for the South Bend Paper Company, unincorporated. Early in 1885, I invested \$500 (nearly all my capital) in a small idle straw wrapping paper mill at Marseilles, Ill. We hired Frank Brewer to run it. Mr. Brewer has been with us the fifty odd years since that time and is almost entirely responsible for any manufacturing success we have had. At Mar-

seilles I also started a small paper jobbing business for myself. All my cash capital was \$269.00, but credit and an ample supply of grocer's and butcher's straw paper from the mill was available. The procedure was to make a short trip out, then back to Marseilles to pack, mark, ship and bill the paper sold, attend to correspondence and collections, go to the bank and post office and work the local stores. After about a year, O. L. Hammond was employed, and he continued with our organization until his death in 1924.

"In February, 1887, my brother, E. C. Westervelt, acquired a small straw wrapping paper mill in Springfield, Ill. In 1889 I bought the mill. It was sold in 1893 when we, E. C. Westervelt, Frank Brewer, O. L. Hammond and I, decided to build a mill in Taylorville, Ill. We incorporated the Prairie State Paper Company; capital \$40,000, with \$26,000 paid in. The first Taylorville paper machine was an 86-inch two-cylinder built by Beloit Iron Works. The mill began production in October 1894, making twenty tons of straw paper a day, in two shifts. The next machine was a 126-inch Four-drummer, making twenty to twenty-two tons of grocer's paper (wood pulp) a day, about 1910. We were running three eight hour shifts at that time.

"The Taylorville mill was sold to the Hopper Paper Company, for bond paper, when this company 'turned south', and is still in operation. Our first bag machines were built in 1897 in Taylorville, making the Atlas sugar bag.

"We undertook to design machines for 'E-Z Opener' bags, but expenditure was considerable, without results. It was a long slow pull for me, but was finally successful. Made E-Z Opener sugar bags for the market on April 10, 1902

(over three years after I undertook to personally design the machines) and made the lighter weight grocery bags two years later."

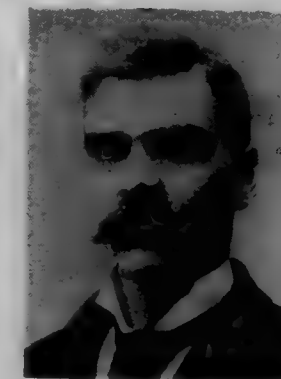
In 1907 the machine shop and equipment was moved to Taylorville, and the corporation name was changed from Prairie State Paper Company to the E-Z Opener Bag Company. The sales department was also moved to Taylorville and F. M. Dickinson became sales manager.

The history of the E-Z Opener Bag Company, as described by Mr. Westervelt, was the forerunner of the continued Taylorville mill (1894-1923); the bag factories at Fulton, N. Y. (1907-18); Decatur, Ill. (1911-29); Orange, Texas (1912-28); New Orleans, La. (1918-31); and of the kraft paper mill at Braithwaite, La. (1915-31).

Of the approximately two hundred twenty-five tons of paper produced daily, forty per cent goes into wrapping sheets and rolls, and the other sixty per cent into about eleven million bags each day.

Late in 1938, H. E. Westervelt, president and founder of the corporation, died at the age of eighty. His vision, ability, patience and faith guided the destiny of the company until the \$769.00 invested in 1885, grew into the present modern, debt free, progressive enterprise.

He was succeeded, as president, by his daughter, Mildred Westervelt Warner (Mrs. H. D. Warner). F. M. Dickinson remains vice-president in charge of sales, while Mr. H. D. Warner is secretary-treasurer. Other active vice-presidents are W. E. Penfield, manufacturing, and H. H. Yoder, industrial relations. Frank Brewer has retired, but remains one of the directors. W. P. Thielen is also a director.



FRANK BREWER



H. E. WESTERVELT



F. M. DICKINSON



GULF STATES PAPER CO., TUSCALOOSA, ALA.







## Hammermill Paper Co., Erie, Pa.

Hammermill Paper Company, Erie, Pa., pioneered in the manufacture of fine papers from fibers produced by the sulphite process.

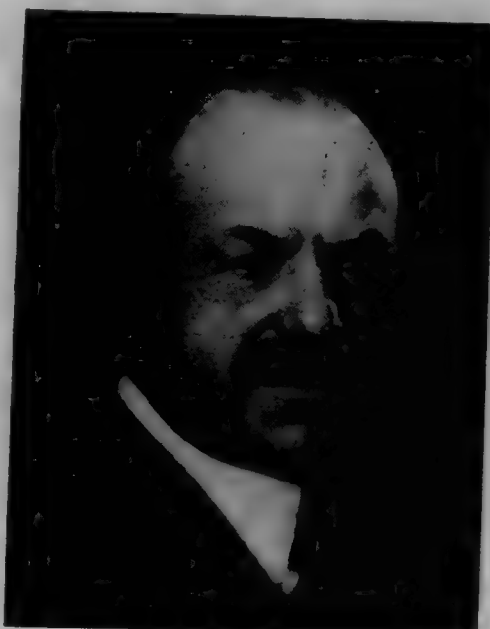
The firm was founded in 1898 by two brothers, the late Mr. Ernst R. Behrend and Dr. Otto F. Behrend, in association with their father, Mr. Moritz Behrend. Mr. Ernst Behrend was president of the company until his death, September 22, 1940; Doctor Behrend is still active as treasurer. These men introduced new methods and new equipment to American papermaking.

Erie was chosen as the site of the new mill for several reasons. First, because of the cheap water transportation from the pulpwood forests of the St. Lawrence and Great Lakes areas; also, because of the unlimited supply of fresh water available in Lake Erie, the nearness of the Pennsylvania coal fields, and the city's excellent railroad facilities for overnight deliveries to the nation's largest markets. Besides, Erie offered good living conditions for workmen and their families.

Originally Hammermill had one paper machine and about 200 employees. An immediate acceptance of the mill's products afforded a steady growth, so that in 1912 five machines were in operation. In those early years, paper was made with private watermarks for each customer, and at one time more than 200 different brands were being made.

In 1912 Hammermill Bond was introduced and was given the backing of national advertising. In a short time it replaced the private brands that had been made up to then.

Sold through a system of independent paper merchants, the new paper found an ever expanding market. Additional mill lines took their place beside Hammermill Bond until today there are a score of grades carrying the Hammermill name—papers for almost every business and advertising use.



ERNST R. BEHREND



N. W. WILSON

Early in 1940 the sixth paper machine was added. In Erie the company now employs nearly 1500 men and women, and it occupies more than 200 acres of plant and wood storage space.

During all these years, the policies of Hammermill's founders have been far-seeing, and have made for excellent relationships between management and employees. This mill was one of the first organizations in the country to install a profit-sharing system and to grant hourly workers vacations with pay. Today one out of four of its workers are veterans with twenty years or more of service; many sons are following in their father's footsteps in Hammermill employ.

Thus, while its products have earned an international reputation for their excellence, Hammermill has also become known as a good place to work.

The following is a partial list of Hammermill Papers:—

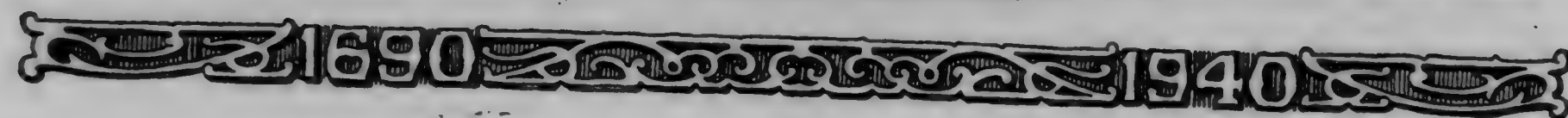
Hammermill Bond, Hammermill Bristol, Hammermill Cover, Hammermill De Luxe Cover, Dura-glo Hammermill Cover, Hammermill Manuscript Cover, Hammermill Duplicator, Hammermill Ledger, Hammermill Mimeo-Bond, Hammermill Offset, Hammermill Opaque, Hammermill Posting, Hammermill Safety,

Management Bond and Whippet Bond.

The present officials of the Hammermill Paper Company are as follows: N. W. Wilson, president and general manager; Dr. O. F. Behrend, treasurer; D. S. Leslie, first vice president and assistant general manager; W. T. Brust, vice president and assistant treasurer; W. F. Bromley, secretary; H. F. Obermanns, vice president in charge of manufacturing; H. R. Baldwin, vice president in charge of sales; M. Harrison, vice president in charge of industrial relations; F. P. Klund, assistant secretary and advisory engineer; A. E. Frampton, assistant secretary, advertising manager, and assistant general sales manager.



PLANT OF HAMMERMILL PAPER CO., ERIE, PA.



## Hinde & Dauch Paper Co., Sandusky, Ohio

The Hinde & Dauch Paper Company was established in 1882 at Sandusky, Ohio. The founders, whose names still continue in the corporate title, were James J. Hinde and Jacob J. Dauch. Pooling their slender resources, a partnership was formed and the young men started in business with a threshing machine and a straw baler. Their chief assets were their reputations for honesty and hard work, rather than in plant and equipment which had a value of only a few hundred dollars. One of them had taught at a business school and the other partner was a deck hand on a lake boat.

One of the customers of Hinde & Dauch was the Sandusky Paper Mill, a small concern which manufactured the old-fashioned straw wrapping paper used by butchers. The mill closed down in 1887 because of financial difficulties. Hinde & Dauch leased the mill from the bank owner for \$25 a month. Later they bought it with borrowed capital for \$2,500. There was such a limited demand for straw paper that the profits of Hinde & Dauch were often so meagre that the two partners were able to take home \$10 a week or less.

Corrugated paper, on which the original patents had expired, attracted them. Through experimentation they developed a wrapper for protecting lamp chimneys, glass jars and bottles. Their new product, known as "Climax Wrapper," was a corrugated paper tube. It proved cleaner, lighter in weight and much easier to use than the cut straw wrappers of that period. The "Climax Wrapper" put enterprise in the packaging business and was one of the fore-runners of the thousand-and-one different paper items manufactured at the present time.

The Hinde & Dauch partnership was not content, however, in developing merely an excellent product but they also successfully merchandised it. Their efforts provided the impetus which started the upward trend in sales and earnings which has continued to the present day.

A good business had been built in 1909 in a new patented wrapper, in straw paper and other miscellaneous items, such as bolster rolls, a popular article of that day for decorating beds. Annual sales in that year rose to \$1,000,000. But corrugated paper boxes for freight shipments, now the most important product of the Hinde & Dauch Paper Company, had not been developed.

An enterprising young salesman is believed to have suggested the first corrugated paper shipping boxes the company manufactured. This salesman sold a Buffalo cereal company the idea that paper boxes would be suitable for shipping its products and he succeeded in getting an order for two carloads of paper boxes. When the order was received at the home office in Sandusky, Mr. Hinde, who was president, said corrugated paper boxes would not carry heavy freight. It was a revolutionary idea. But the Hinde & Dauch company made experiments and at

length produced a box that not only met all shipping requirements but proved even more successful than the salesman had thought possible.

Sidney Frohman, the present head of the company was hired as treasurer in 1910. He was well grounded in the paper industry when he joined the Hinde & Dauch Paper Company. As a salesman and director of the Sandusky Foundry and Machine Company, specialists in paper making machinery, he had visited paper manufacturing plants throughout the country for over seven years. This experience gave him a knowledge of both production and sales. Prior to that he worked for a short time as a street car conductor and later as freight agent and secretary to the general manager of the former Lake Shore Electric Railway Company. Undoubtedly this early training impressed him with the importance of transportation as a cost of doing business and as a factor in prompt deliveries.

In the first year of Mr. Frohman's connection with the Hinde & Dauch Paper Company, the policy was adopted of locating manufacturing plants near large industrial centers to facilitate prompt deliveries and to keep costs down. This practice has resulted in a reduction in delivery time for orders from 60 days or more a few years ago, to a matter of hours today. It was during this first year of Sidney Frohman's connection that the company established a Canadian plant. Although prompt deliveries have aided the company, no one policy has been responsible for the company's success. Rather, it has been achieved because Mr. Frohman has been able to coordinate all departments of the business.

To meet the growing demand for its products, the Hinde & Dauch Paper Company has expanded its manufacturing facilities until it operates 16 box plants and 10 paper mills, extending from the Atlantic Seaboard as far west as Kansas, to North Carolina in the south, and north to Montreal. When possible the company has added to its capacity through the acquisition of established plants. Most of the higher positions in the company are filled by employees who have come up through the ranks. The present officers are: president and general manager, Sidney Frohman; vice-president, mill division, J. W. Harbrecht; secretary-treasurer, W. F. Pfeiffer.

The Hinde & Dauch Paper Company continue to spend much time and money in the maintenance of its "package laboratories." They have expanded from the single "sample room" at Sandusky, until one is maintained in connection with each of the company's larger plants. Thus, the company develops many types and styles of packaging specialties. Research has also led into the printing and coloring fields, resulting in a widely known line of display containers. The company has also developed and patented insulating material of corrugated paper for automobiles, refrigerators and building construction and solid fiber boxes have been made at two plants.





## Hollingsworth & Whitney Co., Boston, Mass.

The Hollingsworth & Whitney Co., was established on April 5, 1862, at Boston, Mass. Ellis A. Hollingsworth and Leonard Whitney Jr. formed the partnership of Hollingsworth and Whitney, for the manufacture of paper and paper bags. Mr. Whitney had been operating a paper mill and bag factory at Watertown and Mr. Hollingsworth had operated a paper mill at South Braintree, Mass.

Ellis A. Hollingsworth was a son of Mark Hollingsworth who had a paper mill on the Neponset River below Mattapan, near Boston, as early as 1801. Another son, Lyman Hollingsworth, discovered an improved method for the manufacture of a strong paper by the utilization of waste rope in the manufacturing process. This improved process was mothered by necessity, for Mr. Hollingsworth being faced with a shortage of stock after the panic of 1837 tried the experiment of cutting the bolt ropes off some old sails lying in the mill yard and using this material in the manufacture of paper. The result was a fine manila paper of great strength and good quality. The patent for this discovery was granted to John M. Hollingsworth and Lyman Hollingsworth in the year 1843.

Charles A. Dean became associated with the company in 1874 as sales manager, and in 1876 a mill was purchased at Gardiner, Maine, which was to be the site of continuous operation from that date until 1939.

On April first 1882, following the death of both partners, the business was incorporated as Hollingsworth & Whitney Company, with Sumner Hollingsworth as the first president. In this year Charles A. Dean became vice-president and general manager.

Under his management, the growth of Hollingsworth & Whitney Company was outstanding. The tonnage of paper produced increased from 2,705 tons in 1882-1883 to 54,000 tons in 1911, the year of Mr. Dean's retirement, while in the same period the capital stock increased from \$500,000 to \$5,000,000.

Construction was started on the company's large mills at Winslow, Maine, in 1891. Here were built paper and pulp mills. The capacity of this unit was increased under Mr. Dean's direction and that of his successors, W. E. Pratt and M. L. Madden, to a point where 300 tons of paper are produced per day on six paper machines, and the daily production of sulphite pulp is 190 tons. The bleach plant has a capacity of 50 tons per day. In 1908 groundwood mill was built at Madison, Maine, with a capacity of 100 tons per day.



HOLLINGSWORTH & WHITNEY CO., WINSLOW, ME.

The company's new Chickasaw Mills at Mobile, Ala., include a pulp mill, pulp - drying machine, bleach plant, Fourdrinier paper machine and cylinder paper machine, and all necessary equipment. The plant is designed to produce approximately 200 tons of sulphate pulp, bleached and unbleached. The paper machine capacity is approximately 160 tons. The balance of the pulp will be dried for shipment. The Hollingsworth & Whitney Co. now produces all the pulp required for its mills, and thus rounds out a program of sound expansion. The main office is at Boston, Mass.

The officers of Hollingsworth & Whitney Company are: M. L. Madden, president; W. B. Merlin, vice-president; H. C. Thayer, treasurer; and Robert Nivison, manager of mills.



HOLLINGSWORTH & WHITNEY CO., MOBILE, ALA.

## Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.

The Kalamazoo Vegetable Parchment Co. was established at Kalamazoo, Mich., in 1909. This mill got its start because Jacob Kindleberger, a young salesman for the West Carrollton Parchment Company, foresaw the increased need for and use of special papers for the protection of foods. Coming to Kalamazoo in the fall of that year he, with his brother-in-law, Harry Zimmerman, organized a company to convert waterleaf into genuine vegetable parchment. J. J. Knight, an influential Kalamazoo capitalist, subscribed the first \$10,000 and with his name heading the list, the remainder of the original \$50,000 capital was quickly taken up. The first paper was delivered April 5, 1910. Capitalization is now \$5,000,000 all of which is in common stock. There is no bonded indebtedness.

Genuine vegetable parchment has always been the backbone of the business, but companion papers, many of them originating with KVP, have been added through the years to round out a complete food protection line. The first of these was waxed paper, waxing equipment being added the second year of operation.

By 1916 the business had increased to an extent that it became necessary to build a two-machine paper mill to assure raw stock requirements. The machines were a 116-inch Horne Harper and a 164-inch Pusey & Jones.

Further converting requirements caused the construction of a second paper mill in 1922 and a line of bond papers was also added. A 165-inch Bagley & Sewall machine, designed to run nearly twice as fast as any previously existing paper machine on comparable papers, was installed. In 1928, a 166-inch Beloit was installed beside it. Mill No. 3, with a 138 Bagley machine and Yankee dryer was started up in 1937. A sizeable bleach plant handles most of the company's bleach requirements. Paper machine capacity

is approximately 430,000 pounds in 24 hours.

Paralleling this growth and in fact the reason for the paper mill expansion, has been the extensive converting operations of parchmmentizing, waxing, printing, ruling, laminating, and special treating. Allied operations include plate and ink making. About 1500 people are employed in these numerous operations. Converting plants are operated in Philadelphia, Pa. and Houston, Texas. Sales offices are maintained in Boston, New York, Baltimore, Philadelphia, Detroit, Chicago, Houston, Minneapolis and San Francisco.

The present officers of the company include J. Kindleberger, founder and chairman of the board; R. A. Hayward, who came with the company as general manager in 1924 and has been president since 1936; C. S. Campbell, treasurer since the company was founded; Alfred Southon, 1st vice-president, in charge of sales, an employee since 1910; James A. Greenlee of the Chicago office, 2nd vice-president; H. H. Jones, 3rd vice-president and sales promotion manager; T. W. Peck, secretary; Wm. Hess, assistant secretary.

Directors include: C. S. Campbell, A. B. Connable, L. H. S. DeWitt, R. A. Hayward, W. E. Kidder, J. Kindleberger, W. J. Lawrence, F. Mosteller, A. B. Read, A. Southon and C. H. Stearns.

KVP is essentially a specialty mill. Its chief products are parchment, waxed, greaseproof, oiled and laminated papers. Nearly every one of these is built to special specifications for the particular protection problem involved. The chief industries served by

these papers include meat packing and poultry, dairy, vegetables, fish, baking, cereal, retail meats, and soap. Other lines include bond, mimeograph, writing, manifold, shelf, waxed, dusting, cookery parchment and pie tapes for the home. Other items include adding machine rolls, envelope and offset.



KALAMAZOO VEGETABLE PARCHMENT CO.



J. KINDLEBERGER

R. A. HAYWARD

ALFRED SOUTHON



## Kimberly-Clark Corp., Neenah, Wis.

The Kimberly-Clark Corporation was established at Neenah, Wis., in 1872. In March of that year four far seeing pioneers, J. A. Kimberly, H. Babcock, F. C. Shattuck, and C. B. Clark, undertook what was then considered a wild venture, broke ground and erected the Globe Mill, the first paper mill in the state of Wisconsin fitted to make print and book papers entirely from rags. This mill was started on October 22, 1872, making its first sheet of rag print and glorying in making about two tons of paper a day on a 72 inch single cylinder machine.

Since then much water has gone under the bridge and the "wild venture" of 1872 has developed into a vigorous industrial enterprise. For the first thirty-five years the organization progressed first, as a partnership, then as a corporate entity with the stock closely held within the families of the four original partners. During its sixty-eight years Kimberly-Clark has had but two presidents—J. A. Kimberly from 1872 until his death in 1928 and subsequently F. J. Sensenbrenner. In 1907 a reorganization took place in which Mr. Sensenbrenner became a major stockholder. Other leaders in the business at that time obtained a stock interest. By 1928 the organization had grown to a point where it seemed advisable to again reconstruct its capital structure and at this time Kimberly-Clark became a public company under the corporate title "Kimberly-Clark Corporation." The general offices have remained at Neenah since 1872.

Over the years the company has constructed and reconstructed plants in Neenah, Appleton, Kimberly, Niagara, Wis. and Niagara Falls, N. Y. Extensive timber holdings were acquired in Minnesota and in the Gogebic Lake district of northern Michigan. In 1920 they acquired valuable water power and timber rights at Kapuskasing, Ontario, approximately 450 miles northwest of Toronto. This Canadian venture, in company with the New York Times, known as the Spruce Falls Power and Paper Company, Inc., eventuated in a modern hydro-electric development, groundwood and sulphite mills and a paper mill capable of producing 600 tons of newsprint per day.

Hyflect and Kleerfect for rotogravure printing and general publications, also a large tonnage of light weight papers

for catalog use, are produced at Kimberly, Wis. These papers are especially adapted to fast press runs. The Niagara, Wisconsin, plant turns out 100 tons of paper daily for publications, mail order catalogs, and the rotogravure sections of large newspapers.

At the Badger-Globe and Lakeview Mills in Neenah, crepe wadding products in the form of sanitary pads, facial tissues, handkerchiefs and hospital wadding are manufactured for International Cellucotton Products Company exclusively, and sold by that company under the well known trade names

Kotex, Kleenex, Delsey, etc. The Lakeview Mill also produces specialty papers such as cover stock, school papers, fancy box covers, ticket stock, etc., in addition to raw stock for the wall paper which is printed at the Atlas Mill, Appleton.

During the past year there has been under construction at Neenah a unit to house one of the newer Kimberly-Clark products, KIMSUL, a material designed to insulate against sound and temperature. The plant at Niagara Falls, New York, contributes to the company's growing trade in crepe wadding products, such as Kotex, Kleenex, Kimpak, Sanek, etc., and, in addition produces approximately 135 tons of rotogravure papers per day.

The management of the business foresaw some years ago that to sustain their projected program of growth and expansion a progressive personnel program would be advisable and there have, accordingly, been incorporated into the routine of the business many features, any one of which would form the basis for a human interest story.

Many hundred employees take advantage of the annual health examinations that may be had at company expense.

Through the Mutual Benefit Association the 4667 members receive assistance in paying hospital and surgical bills, dental work and bills of oculists, etc., to the amount of \$60,000 annually. 5206 individuals in the group life insurance program with \$9,536,500 of coverage. Neither company nor employees would be without their job evaluation and merit rating program. A vigorous year round safety program is promoted in all plants of the corporation. And last but not least is a community relations program designed to cultivate and consolidate understanding between the industry and the several communities in which the corporation's plants are located.



F. J. SENSENBRENNER



KIMBERLY MILL OF THE KIMBERLY-CLARK CORP.

## Marathon Paper Mills Co., Rothschild, Wis.

The Marathon Paper Mills Company was established on February 13, 1909, at Menasha, Wis. The original capitalization consisted of 7,500 shares of common stock at \$100 per share par value. A decision to build a paper mill was reached by a group of local residents who had originally organized the Rothschild Water Power Company, to deal in real estate, buy and sell logs and timber, developing water power, etc. The decision was necessary because the State of Wisconsin had decreed that all the holders of water power rights must develop water power within a year, or lose their franchise. Original subscribers to the stock of the Marathon Paper Mills Company consisted of:

John D. Ross, E. W. Brooks, Chas. J. Winton, Brooks & Ross Lumber Company, G. D. Jones, Walter Alexander, Alexander Stewart, C. C. Yawkey, B. F. Wilson, W. H. Bissell, Wausau Law and Land Association, Jacob Mortenson, and the Mathie Bros. Land Company, all of which were in the Rothschild Water Power Company and, in addition, Neal Brown, C. S. Gilbert, Karl Mathie, F. P. Stone, Louis Dessert, J. A. Porter, M. C. Ewing, R. M. Heskett, W. L. Edmonds, H. C. Stewart, W. H. Yawkey and D. C. Everest.

The first organization in direct charge of operations was composed of D. C. Everest, general manager; E. B. Garison, assistant manager; A. M. Van Douser, auditor; John Daley, paper mill superintendent, and Albert Hinzke, sulphite and groundwood mill superintendent. The construction on a dam to furnish power for the concern was started in May 1909, and construction on the buildings in July of the same year. A little later several houses were built for the employees on a hill northeast of the mill. This was the beginning of what is now known as Rothschild.

On November 18, 1910, the first machine of the three installed started making paper; the second one on December 1, 1910, and the third on January 2, 1911. These three machines consisted of a Cylinder, a Fourdrinier and a Yankee machine, with the latter being the largest of its kind in the world at the time. On February 5, 1910, the capital stock was increased to 10,000 shares of common at \$100 par value each.

On October 5, 1911 an almost disastrous flood occurred. At Wausau there were about 10,000,000 feet of logs stored which were quickly swept away and carried down to Rothschild. The boiler house was undermined. Supplies in the basement were ruined and the generators in the power house were so damaged that they could not be operated. Shortly after, it was necessary to issue 6000 shares of 6 per cent preferred stock with cumulative dividends and participating equally with common in any and all dividends declared on common stock. This was

done to help rebuild the dam and the damaged mill.

Some time was required to put the mill in operation. Then, on July 24, 1912, only a few months after paper was again being manufactured, there was another flood. This time it was necessary to dynamite the coffer dam, constructed in order that the original dam could be rebuilt, to release the water pressure. Supplies were again damaged, generators were ruined and things looked very serious.

In 1916 another Yankee machine was added to take advantage of a boom in the demand for light, watermarked, wrapping papers. This machine was later converted to a Fourdrinier type in 1922. Another development in 1916 was that of a bleached lined board which was sold to a young

company in Menasha for packaging butter. This product was new on the market and marked the first use of a quality board in food packaging. It was a hard product at \$100 a ton; whereas the regular board was priced at \$40 a ton. Management thought that it was the coming thing in food packaging and management was right. The company to which the new board was sold was the Menasha Carton Company and eleven years later this company was added to the organization.

On November 18, 1920, the capital stock was increased to \$4,000,000 consisting of 34,000 shares of common and 6000 shares of preferred stock, both of which were at \$100 par value. On October 10, 1927, another increase in capitalization took place to the extent of issuing an additional

10,000 shares of common stock for the purpose of purchasing the Menasha Printing and Carton Company of Menasha. On November 1, of the same year, this merger was consummated.

A brief resume of the history of the Menasha company also shows an interesting development. A former newspaper man, Sam Clinedinst, came to Menasha, Wis., in 1900, and set up an antiquated printing press on the third floor of a paper mill. By 1904, however, he was able to incorporate as the Menasha Printing Company and by 1912 had added a paper mill.

George S. Gaylord also was confronted with many obstacles when he organized the Menasha Carton Company in 1912 to make butter and cheese cartons. The year 1916 was an important one for both men. In that year Gaylord began to buy board from the Marathon Paper Mills Com-

pany and make high grade cartons. It was during the same year that waxed paper business began to grow because of the legislation in various states, making waxed paper wrappers compulsory in the bakery business.

Both of these Menasha companies were operating in the food packaging field and it appeared that a merger would be desirable, so in 1917 the two companies formed



MARATHON PAPER MILLS CO.



C. C. YAWKEY



D. C. EVEREST



NEAL BROWN





the Menasha Printing and Carton Company. The relationship between Menasha and Marathon became so close that a consolidation was consummated in 1927.

On September 24, 1929, the entire capital structure of the Marathon Paper Mills Company was changed. The cumulative and participating preferred stock was retired and in the place of each share of old preferred, one share of new non-participating preferred and four shares of new \$25 par value common stock were issued. All of the old common stock was changed to four shares of \$25 par value for each share of \$100 par value stock.

On October 20, 1937, a dividend on common stock was paid in preferred stock. The present capital stock consists of 200,000 shares of \$25 par value common stock and 12,000 shares of \$100 par value preferred stock, which totals \$6,200,000. At the present time the book value of the company totals some \$13,000,000 and since the acquisition of the Menasha Printing and Carton Company in 1927, the company has added a converting plant in Milwaukee, a sawmill in Ironwood and cutting rights for timber in Canada. Two objectives in obtaining Canadian cutting rights were to secure a long time supply of spruce wood for the Rothschild pulp

mill and also to secure a cheap and continuous supply of high grade wood from which to secure the highest grade of bleached sulphate pulp possible to produce from a pulp mill to be built within the Province of Ontario and on Lake Superior. This district is noted for its purity of water and is so situated that it insured cheap transportation costs to the Rothschild, Menasha and Ashland plants and also will provide a high grade bleached sulphate pulp for the Central West pulp market on a comparatively low delivered cost.

At the annual meeting of stockholders on December 19, 1938, the number of directors was changed from nine to eleven. The following officers and directors were elected:

C. C. Yawkey, chairman of the board; D. C. Everest, president and general manager; Leo E. Croy, vice-president; John Stevens, Jr., vice-president; P. M. Wilson, secretary and treasurer; Ben Alexander; Lester Armour; L. F. V. Drake; C. S. Gilbert; M. P. McCullough and C. J. Winton, Jr.

Credit for the development of the company has been due to the far-sightedness of its executives and directors in developing a diversity of products and maintaining research departments to develop new products.

## Chillicothe Paper Co.

The Chillicothe Paper Company, Chillicothe, Ohio, was incorporated under the laws of Ohio in June 1919; the original officers being:

Hector McVicker, president and general manager; George Litter, vice-president; Austin P. Story, treasurer; Lyle S. Evans, secretary; Edwin F. Bearce, chief engineer.

The original mill, which started in May of 1920, consisted of one Fourdrinier machine, with a trim of 144 inches, and all the necessary auxiliary equipment, including power plant.

The mill which was built for making high grade uncoated book papers started up on newsprint, which was sold at prices ranging from 8 cents a pound to 11 cents a pound, because that was just at the time of the most abnormal demand for paper, and the sales department now looks back with longing eyes at those days, and wishes it could now have just a little bit of the same experience.

After the slump of 1921, the company started on its successful march to gain its reputation for high quality papers, and with increasing demand, it was necessary to add a second larger paper machine, which started operations in March of 1928. This machine has a trim of 144 inches, and gave the mill an annual capacity of twenty-one thousand tons.

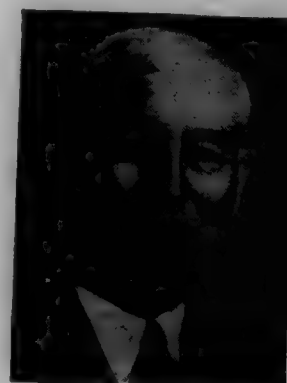
Early in its history The Chillicothe Paper Company turned to the making of paper for the offset printer, as somewhat of a specialty, and has kept up with the steady growth

in this type of printing, and with the technical advances necessary in making this type of paper. In 1936, a complete system of moisture and humidity control was installed in the mill. This included controls on the paper machines, to regulate the moisture in the paper, and the building of one of the first completely conditioned finishing rooms. This careful control of moisture and humidity has made it possible for most of the users of the Offset paper purchased from this mill, to print the paper directly from skids or cases, without hanging or further conditioning in the printer's plant.

Adena Offset is the leading brand of paper made by this mill, and recently they have developed a new paper called "Halftone Offset Dull" and "Halftone Offset Gloss," which gives the lithographer papers with characteristics between those of coated Offset and standard type of Offset paper. The equipment includes pasting machine, several embossing machines, a gravure and aniline printing machine, which are used for special papers, such as are used for greeting cards, high grade papeteries, duplex envelopes, box wraps and other specialties.

The present officers of the Company are: Hector

McVicker, president and general manager; Edwin F. Bearce, vice-president; Austin P. Story, vice-president and treasurer; Lyle S. Evans, secretary; A. I. Cahill, sales manager; F. L. Zellers, general superintendent; Russell McVicker, purchasing agent.



HECTOR McVICKER



EDWIN F. BEARCE



AUSTIN P. STORY



## The Marvellum Co., Holyoke, Mass.

In 1921 The Marvellum Company was established in Holyoke, Mass., by George Senseney, Russell Bracewell and Francis C. Heywood to produce an original concept of decorated papers.

While the old order remains properly stabilized and often reasonably prosperous it is the creative, the wholly new, the inspirational spirit of a mill by which it is able to move bravely forward during otherwise static times.

The history of Marvellum is the story of invention—all the way from creation of a wholly original process to the conception and then the designing and building of specialized machinery by which the idea might become a manufactured product; it is the marbling papers spurring in an orgy of fantastic color harmonies; it is the deft spotting and blending of colors from the artist's brush reproduced by machine just as the full rich ever-varying tones of a great violinist come from the phonograph disc.

### Artist—Chemist—Engineer

First there had to be the artist, then the blending of artist and chemist and third the union of those two with the skilled visionary engineer.

The artist is George Senseney, pupil of Jean Paul Laurens and Benjamin Constant in Paris; member of the Societe des Graveurs; Salmagundi Club; Society of Etchers and a former Instructor of Design at Smith College, Northampton, Massachusetts. While working in his studio at Northampton, Artist Senseney developed the basic idea of coagulating silver and gold liquid bronzes with a whole spectrum of brilliant combining colors to produce a new decorated paper.

The chemist, Russell Bracewell, became associated with Artist Senseney while he, Bracewell, was engaged in chemical research at one of the major Holyoke paper mills. Together, artist and chemist worked out a hand process by which each individual sheet was decorated with indigo, coral, red, jade, gilt and other exotic tones but it was slow work and limited in output.

That is where the engineer, Francis C. Heywood, joined forces with artist and chemist and together they created a machine capable of duplicating the hand work; a machine so versatile that rolls of paper could be decorated with a constantly varying pattern of color.

### New Plant Occupied

It was nineteen years ago, in the year 1912, that these three established The Marvellum Company in Holyoke, Massachu-

setts. By the middle of 1922 the new machinery was developed to the point where decorated papers were being produced in commercial quantities in a five thousand square foot plant which was outgrown almost immediately and new plant facilities with approximately 35,000 square feet occupied. Much of the early production was of envelope lining papers, greeting card papers and decorated technical paper for radio cone speakers.

By 1928 the business had expanded far beyond the capacity of the second plant and Marvellum acquired the building and machinery of the Whitmore Manufacturing Company in Holyoke, which—with the addition of the equipment from the former plant—expanded the variety of decorative specialties and provided facilities for adding a surface coating department.

The recent history of The Marvellum Company has kept the pace of the rapid development of its early history. To the equipment which was taken over when the Whitmore was purchased has been added much specialty coating and embossing equipment for producing the beautiful fancy papers and cover stocks which are synonymous with the name "Marvellum".

### Sales Impetus

The development and expansion of products required an aggressive and experienced sales personnel. William J. Warner, for many years one of the leading sales executives of the paper industry, joined the young company as Vice President and Sales Manager.

As the business grew, Maurice A. Park, long experienced in the specialty and cover paper markets joined The Marvellum Company to supervise the Cover and Specialties Department and Paul L. Houston became manager of the Box Covering and Fancy Paper Department.

The growth of this company through the depression years necessitated greatly enlarged sales offices; a new Order and Traffic Department, with Theodore Main joining the organization as its Manager; the expansion of its research and control laboratory under Carroll Enemark, its Chief Chemist. An up-to-the-minute hospital, fully equipped has been recently completed. Everything has been done to insure the high quality for which the mill is noted.

### The Keynote

The keynote of Marvellum production is expressed in the by-line "Papers Distinctive."



GEORGE SENSENEY



RUSSELL BRACEWELL



FRANCIS HEYWOOD







## The Mead Corp., Chillicothe, Ohio

The Mead Corporation of today is the direct outgrowth of two of the earliest established paper mills in the middle west. For three generations the Mead family has been identified with the paper-making industry of Ohio and the story of progress of "Mead Papers" is a business romance, built around the struggles of the industrial pioneers of the Miami and Ohio valleys.

More than ninety years ago Daniel E. Mead, in company with several business associates, organized the firm of Ellis, Clafflin & Company, for the purpose of manufacturing book and other printing papers in Dayton, Ohio. In 1881 D. E. Mead obtained full ownership and adopted the name of the Mead Paper Company and in 1885 he purchased the Chillicothe Paper and Pulp mill.

The business thus founded in 1846 was continued as a privately owned company for the next sixty years. In 1905 it was found necessary to begin enlarging the company in order to establish a proper position in the industry and shortly thereafter, the Mead Pulp and Paper Company was incorporated under the laws of Ohio. In 1907 the equipment of the original Dayton plant was moved to Chillicothe.

Largely due to the technical knowledge of Geo. H. Mead, a graduate of the Massachusetts Institute of Technology, and from practical knowledge, having worked in his grandfather's mill, the growth of the corporation was rapid, though constructive and aggressive. The Chillicothe plant alone soon developed into one of the two largest in Ohio manufacturing paper.

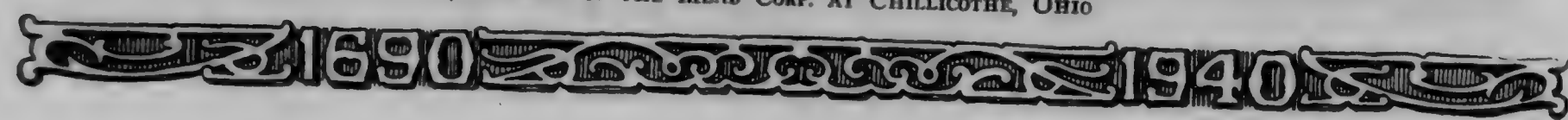
The present Mead Corporation was formed in 1930 and today has grown into a far-reaching institution, embracing twelve divisions and subsidiaries for the manufacture of pulp, paper, paper-board and chestnut extract for tanning with plants located in seven states. Employment is furnished to approximately 4,100 people.

In 1932 the Corporation took over the management of the Dill & Collins plant in Philadelphia, Pa. This mill traces its early history to the first paper mill in America which was established in 1690 by William Rittenhouse. This year is being celebrated as the 250th anniversary of the Rittenhouse mill.

In 1933 the Corporation acquired the Wheelwright plant in North Leominster, Massachusetts. This mill was leased in 1858 by George W. Wheelwright, who in 1863, purchased the mill and is said to have discovered the possibility of using old printed papers for manufacturing into fresh paper to take the place of rags. It was in the Wheelwright mill in 1880 that the first manufacture of mill bristles in America was instituted.



PLANT OF THE MEAD CORP. AT CHILICOTHE, OHIO



## Miamisburg Paper Co., Miamisburg, Ohio

The Miamisburg Paper Company, known originally as the Miami Valley Paper Company, was established in 1871 by Captain Emanuel Shultz who built the mill at Miamisburg, Ohio, in the heart of the Miami Valley. Construction of the original buildings begun in July, 1871, was completed in November of that year and the first paper came over the machine on January 17, 1872.

One Fourdrinier had been installed and it was used exclusively for the making of book paper out of rags.

Captain Shultz, a capitalist in his day, had interested his son-in-law, Dr. William H. Manning, in the venture and he it was who had complete charge of operations when Captain Shultz was elected to Congress about 1880. Dr. Manning retired from the business a short time after Captain Shultz returned from Washington and soon afterwards, in 1890, the mill was sold to J. H. Friend who was President of The George H. Friend Paper and Tablet Company of West Carrollton, Ohio.

The original Fourdrinier machine was then used to make newsprint, butcher's manila and No. 2 manila, and wood pulp was used thereafter instead of rags.

The mill and practically all the equipment was destroyed by fire in 1893. It was promptly rebuilt and this time a cylinder machine was installed. The principal product marketed was mill wrappers and papers used in the making of containers such as oyster and berry buckets.

On October 24, 1894, the company was incorporated under the laws of Ohio as the Miamisburg Paper Company with J. H. Friend as President and Treasurer and R. W. Burns as Vice-President and

Secretary.

The mill site was then purchased by the Miamisburg Paper Company from the George H. Friend Paper and Tablet Company.

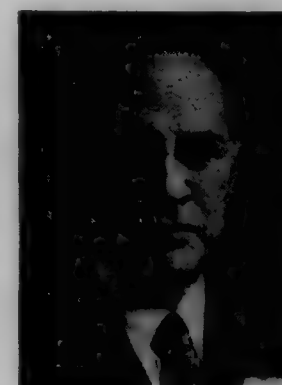
A short time thereafter the cylinder machine was removed and two Fourdriniers installed. These were used for the making of butcher's manila, No. 2 manila, cash register and detail paper, and colored cover paper. A super-calender was installed for the supering of the colored cover.

In 1906 the mill was purchased by the American Envelope Company of West Carrollton, Ohio. For

a while one machine was used to make manila, cash register paper and colored news and the other machine was used in the production of envelope paper. The super-calender was used for the supering of the envelope paper.

In 1920 the two machines were abandoned and a larger machine installed. The present equipment consists of one 128 inch Fourdrinier which trims 118 inches, three beating and two refining engines. The company continued to operate as a

subsidiary of the American Envelope Company until January 2, 1940 when it was dissolved as a separate corporation and is now operating as the Miamisburg Paper Company Division of the American Envelope Company. The present officers and members of the board of directors are: Carlton W. Smith, President and Treasurer; Albert E. Smith, First Vice-President and Sales Manager; Horace C. Tracy, Second Vice-President; Raymond P. Bertschy, Secretary and Omer G. Dreher, General Superintendent. Harley L. Werth is Assistant Secretary, Joseph A. McKenny, Jr., Comptroller and Orvon P. Gephart, Superintendent.



CARLTON W. SMITH



HARLEY L. WERTH



MIAMISBURG PAPER COMPANY MILL





## Nashua Gummed & Coated Paper Co.

The Nashua Gummed and Coated Paper Company was incorporated in 1904, one of its founders being James R. Carter, who was also the founder of Carter, Rice & Co., of Boston. The historical background of the Company goes back, however, to 1848 from which time until 1904 several coating concerns operated in Nashua and merged from time to time until the present company's immediate predecessor, the Nashua Card and Glazed Paper Company, sold out to it, its plant and business. The earliest of these older companies, Gill Murray and Gage, began in 1848 to manufacture playing card stock an idea inspired by the thought that the gamblers in the California gold rush would create a heavy demand for cards.

### Start Gummed Department

To digress slightly, Carter, Rice & Co., started a manufacturing department for making gummed paper and tape in 1902, occupying space in a building in South Boston. A fire cleaned it out on Washington's Birthday, 1904. Instead of giving up this project it was decided to find other quarters. The result was the purchase of the Nashua plant and the organization of the present company, then known as the Nashua Card Gummed and Coated Paper Company.

For the next few years gummed and coated products were its principal lines. In 1907 manufacture of waxed paper was begun in a small way, but developed so rapidly that by 1910 another plant in Nashua was leased for that purpose alone.

### Name Changed in 1916

In 1916 the name of the Company was shortened to Nashua Gummed and Coated Paper Company; the making of cards and card stock having been discontinued.

In April 1920 so as to meet the problem presented by Canadian tariff barriers, Nashua established a subsidiary company at Peterborough, Ontario, the Canadian Nashua Paper Company, Ltd. This Canadian Company then was, and still is, devoted to the manufacture of gummed and waxed products.

In 1923 James R. Carter, president of the company and one of its principal founders, died

and Winthrop L. Carter was elected to fill the vacancy.

In 1924 a young and growing division of the company, the Package Sealing Division, was incorporated separately under the name of Nashua Package Sealing Company. This subsidiary is devoted to the manufacture of tape moistening machines and package sealers and the sale of these machines, tape and greaseproof inserts.

In 1925 by dint of careful planning, utilization of improved equipment and leasing of outside storage space the Nashua Company was able to give up its lease on its waxing plant and consolidate its manufacturing and operating activities within its own plant on Franklin Street. All this was done, not only without sacrifice of capacity but with a resultant increase in productivity.



WINTHROP L. CARTER

### Take on Sure-Hold Line

In 1926 Nashua took on the Sure-Hold line of paper products for laundries; under a subsidiary company which was later merged with the parent organization. During this same year the activity of the Canadian plant was increased by the establishment by Nashua and the Sealright Company of Fulton, N. Y., of the Canadian Sealright Company, Ltd., to manufacture milk bottle tops and paper containers for the dairy industry.

In 1935 Nashua purchased the assets of the Package Paper Company of Holyoke, Mass. This act launched Nashua into the producing of printed "Cellophane" which is now an increasingly important part of its business.

### Area of Buildings Increases Four Fold

In the thirty-six years of operation of Nashua Gummed and Coated Paper Company the area of its buildings has increased almost fourfold. There are 25 times the number of employees that there were at first, and the volume of business done in a year is almost 30 times that of its early period.

Throughout Nashua has not only always endeavored to maintain high quality but it has been ever trying to devise new uses for paper which will prove profitable for its customers.



NASHUA GUMMED & COATED PAPER CO.

## Nekoosa-Edwards Paper Co. Port Edwards, Wis.

The Nekoosa-Edwards Paper Company had its inception in 1869, four years after the close of the Civil War when John Edwards, Jr., and his partners established the first pulp mill on the Wisconsin river.

From this nucleus there has been developed throughout the intervening seventy-one years the present Nekoosa-Edwards industrial organization with mills at Port Edwards and Nekoosa, Wisconsin, an artificial lake with a shoreline of more than four-

teen miles and more than thirty thousand acres of forest lands. These early paper pioneers saw in the Wisconsin river area, with its vast timber and water resources, an ideal location for the establishment of paper manufacture. Originally organized as the John Edwards Manufacturing Company, the Nekoosa-Edwards Paper Company was incorporated in 1908 to include the Nekoosa mill, the Port Edwards mill, the Centralia mill, and the Nash Lumber Company holdings. The Centralia mill, which burned in 1912, was replaced the same year with a hydro-electric plant and the electrification of the mills began.

Under the leadership of L. M. Alexander, who was made president and general manager of the company in 1911, the expansion and modernization of the properties was vigorously pursued. Modern hydro-electric plants were constructed at both mills.

Practical, far reaching foresight is exemplified in a forestry program launched by the management in 1925 to perpetuate readily available supply of wood. Complete in every detail down to scientific selection of the very seed from which future pulp wood will grow, this Nekoosa-Edwards forestry program has now reached a point where more trees are planted annually than are being consumed. Thirty thousand acres of land are now under forest cultivation, all within easy trucking distance of the mill. Each year from three and a half to four million trees, grown from seed in the Nekoosa-Edwards nursery, are planted to guarantee a permanent wood supply.

Nepco Lake, an artificial lake begun in 1925 and completed the following year, now supplies the mills with 35 million gallons of pure water daily. Man-

made and spring fed, this lake guarantees the water supply necessary in the manufacture of high grade fine and specialty papers.

In 1927 L. M. Alexander turned over the active management of the company to his son, John E. Alexander, who succeeded his father to the presidency of the organization in 1934. Carrying on the program of constant research and progress instituted by L. M. Alexander, the company introduced the watermarked

line of Nekoosa Pre-Tested Business Papers in 1935. Backed by coast-to-coast promotional work and an extensive advertising and merchandising program. Fine paper shipments have grown constantly year after year.

Paralleling the progress of the fine paper manufactured in the Port Edwards mill is the wrapping specialty and treated food papers line manufactured in the Nekoosa mill. In addition to the many standard established brands such as King William butchers,

Nepco Delicatessen and Modelrap, new sheets such as Nepco Refrigerated Locker Paper and others are being introduced and meeting with wide acceptance throughout the trade.

### A Special Research Division

A special research division has also been set up for the purpose of developing specialty and specification papers for industrialists who require special papers to do special jobs.

The personnel program of the company has been as progressive as the technical program. Almost 90 per cent of the employees receive health and accident benefits through the Nepco Employees Mutual Benefit Association, and carry life insurance therein. Active credit unions in both mills afford the employees opportunity of borrowing at reasonable rates and savings programs at better than average interest.

### Safety Is Keyword

Safety is the keyword of every Nekoosa-Edwards operation and the low accident rate is attested by the fact that many plaques for leading standings in National Safety contests adorn the personnel office walls.



NEKOOSA-EDWARDS PAPER CO., PORT EDWARDS MILL



## Ohio Boxboard Co., Rittman, Ohio

The Ohio Boxboard Company was established in 1903 by the late Edwin J. Young of Wadsworth, Ohio. It was started by necessity. In that early day, the carton industry was in its infancy, and the Ohio Match Company, which Mr. Young and his associates founded in 1895, had difficulty in obtaining the boxboard it needed for the packing of matches. The one board machine, with 30 tons daily capacity, more than filled the need, and additional outlet was sought. Excess tonnage was sold to the K-D Box and Label Company, Cleveland, which was later purchased by the company in 1905. A new plant was then built in Cleveland for the manufacture of both folding cartons and set-up boxes.

With this modest beginning, it was necessary in 1908 to add a second board machine to take care of increased demand. Meanwhile, the rubber industry was growing in nearby Akron, and The Ohio Salt Company's plant had been built in Rittman. Conveniently located, The Ohio Boxboard Company developed and supplied the packaging for these new industries.

In the years immediately following, the company pioneered the development of the solid fiber shipping container, and, with the cooperation of other manufacturers, obtained its acceptance by the railroads for freight shipment. During this same period, the company's engineers also worked out a process for obtaining moisture-resistance in paperboard by lamination with asphalt. Fur-

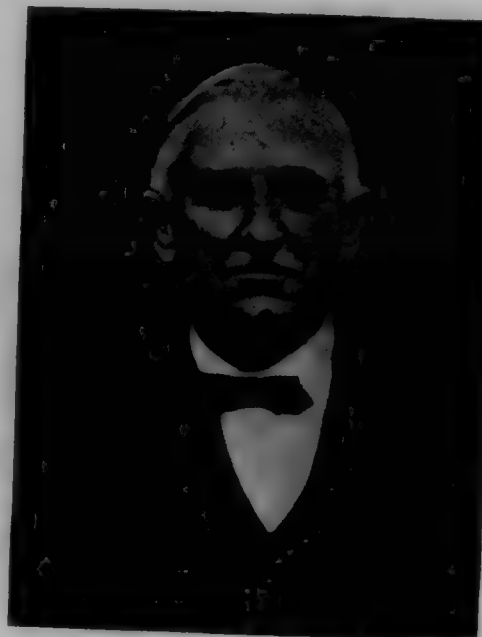
ther development of this process resulted in a product which is today marketed under the company's registered trade name Aqua-Seal.

The corrugated shipping container field was entered in 1923, and a third paperboard machine was installed primarily to supply liner board for this division. At the same time, the paper book match was gaining rapidly in popularity. The match stick presented an unusual requirement in paperboard manufacture, and the only satisfactory material was then imported from Germany. Intense application to this problem resulted in the development of a match stick board which is now a major item in the Company's production.

In the decade from 1920 to 1930, the demand for folding cartons and shipping containers more than doubled. Paper packaging became recognized as an art as well as an industry. The industry now ranks twelfth in the United States, and this company would like to believe that it has made sound contribution to that development. It is interested in the further advancement of paper packaging, and maintains a staff of trained designers and engineers for use by its customers.

Today, with four paper machines, daily capacity is 500 tons of boxboard, most of which is being fabricated.

Officers are Wayne Young, president; F. S. Wake-man, vice president and sales manager; C. E. Carpenter, vice president in charge of production; C. M. Forman, secretary and treasurer.



EDWIN J. YOUNG



OHIO BOXBOARD CO., RITTMAN, OHIO

## The Racquette River Paper Co.

The Racquette River Paper Company was established in 1890 by James A. Outterson. In the Black River district, about Watertown, Dexter, and Carthage, he was often the moving spirit. Mr. Outterson was quite a character, a man of great energy, with ability to rush construction and get a mill going. He was better at that than he was at general mill management.

About 1890 he turned his attention to the Racquette River. Some fifty years ago, acquiring an option on a dismantled sawmill at Unionville, just north of Potsdam village, he finally persuaded a group of local men to organize the Racquette River Paper Company and build a mill. In this group, and its first president, was George W. Sisson. The group also included James A. Outterson; F. F. Flint, secretary; F. L. Dewey, treasurer; and Flora E. Snell, mother of former Congressman B. H. Snell.

After rapid construction, a wooden mill with one machine, pulpwood grinders, and a small sulphite plant began operation. The initial product was newsprint, followed by sulphite manila for which, in those days and for several years, there was a ready market. Mr. Sisson, an old-time lumberman and timberland owner, was largely instrumental in securing lands and timber for the company, which holdings, in succeeding years, gradually reached a total of nearly one hundred thousand acres.

The original paper machine was a 110" Bagley & Sewall machine, to which was added, within a few years, a 76" machine, these two being operated by the same parties until 1901. At this time the daily production was about twenty tons of finished paper, from ground wood and sulphite made at the plant.

In August, 1901, the entire capital stock was taken over by George W. Sisson. His sons then came into the company, with Rufus L. Sisson as Treasurer and George W. Sisson, Jr., Secretary. F. T. E. Sisson began as a paper-maker and eventually became Mill Manager. The timberland department was under Charles H. Sisson, and the general management outside the mill with Fred R. Sisson. Since that time, the entire ownership and management has remained in the Sisson family.

It soon became apparent that the plant must be entirely rebuilt, its capacity increased, and modern concrete and brick buildings, including a steam power plant, hydro-electric development, an electric groundwood plant, a completely rebuilt sulphite plant of fifty tons capacity, and a new 136" paper machine, thus bringing the capacity to seventy-five tons of finished paper per day. While these

improvements cover the period between 1908 and 1913, they by no means represent all of the changes and additions which have been the company's continuing practice, up to the present time. For the beating and preparation of stock for higher-grade papers, additional equipment of the most modern type, including the latest type breaker beaters, refining engines, and hydranners with greatly-increased operating power, has been installed. Complete control formulae for the treatment of stock for special papers are governed by automatic measurement and control devices. On each of the paper machines, additions and improvements have increased speed and improved product. Here again, automatic control methods add uniformity and quality.

The Company has been fortunate in having the best Adirondack spruce from which to make pulp of excellent quality for special papers, producing both bleached and unbleached sulphite pulp and special ground wood pulp for certain papers. The Company has also been particularly fortunate in its power development, owning the entire 63-foot fall in the Racquette River for a distance of three miles above its mill. Two hydro-electric plants with the full flow of the Racquette River supply much of the needed power.

The last word in a steam plant is to be found in the recent installation of two B & W Boilers, equipped with preheaters, adapted to pulverized coal, and all under automatic control of fuel and air feed. This mill was one of the early paper mills to make use of pulverized coal, the installation of which, under Plant Engineer, A. C. Smith, made possible the production of steam at a cost well below that of most mills in the industry.

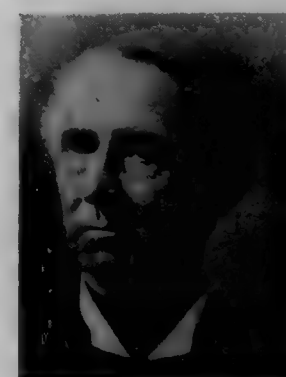
These changes have paralleled the coming into the business of the third generation in the persons of Rufus L. Sisson, Jr., Sales Manager; Lewis H. Sisson, Western Sales Manager; Walter C. Sisson, Treasurer; George W. Sisson 3d, Sales Promotion; and F. T. E. Sisson, Jr., Personnel. Stanley H. Sisson, as manager of timberlands, follows Charles H. Sisson in that department.

The product of the mill is widely distributed. In the New York Sales Office are Frederick McNicoll and Donald F. McCall, both well and favorably known in the trade and most efficient.

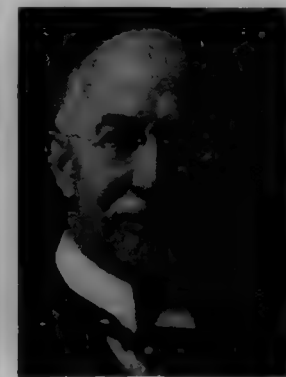
While preceded by other good men, the present Superintendent of Production, Mr. John G. Murray, has, during the past twelve years, demonstrated not only his paper-making skill, but his ability to make friends.



RACQUETTE RIVER PAPER CO.



Geo. W. Sisson



RUFUS L. Sisson



FRED R. Sisson



CHAS. H. Sisson



Geo. W. Sisson, Jr.



F. T. E. Sisson



## Rising Paper Co., Housatonic, Mass.

The Rising Paper Company started operations as the B. D. Rising Paper Company the middle of the year 1900. Bradley D. Rising was president, Charles McKernon was treasurer, Walter J. Raybold was secretary and salesman, and Robert O. Harper was superintendent. Horace A. Moses, nephew of Mr. Rising and present president of the Rising Paper Company, was a director. Mr. Rising had been manager of the Agawam Paper Company from 1872 until its absorption by the American Writing Paper Company in 1899.

With Mr. Moses, Mr. Rising had inspected the Owen Paper Company on the outskirts of the town of Housatonic. This plant had been owned by Owen and Hurlburt since 1858 when the two purchased a wooden building in which papermaking equipment had been installed in 1822. Four years after purchasing the site they formed the Owen Paper Company and for twenty years produced a line of high grade papers; in fact, its paper won a first prize at the Centennial Exposition in Philadelphia in 1876. In the last years of its operation the company had been under the ownership of Henry D. Cone, who envisaged building the finest and most up-to-date paper mill in the country. Unfortunately this modernization was never completed because of financial difficulties.

Mr. Rising took over this defunct mill and organized the B. D. Rising Paper Company, completing the construction of the Cone mill. Upon Mr. Rising's death in 1903, Edmond Day became president but was soon forced to retire because of ill health. O. A. Miller of the Central Ohio Paper Company was then elected president, holding this position until his resignation in 1918. From that time until late 1928,

Mr. Charles McKernon was president.

Late in the fall of 1928, Mr. Moses, president of the Strathmore Paper Company, bought the controlling interest in the company and reorganized it as the Rising Paper Company. Mr. Raybold, who had been with the company since its inception, became president and Mr. Moses became treasurer.

Mr. Raybold continued as president of the company until his death in 1938. Mr. Moses then assumed the presidency of the company and still holds this office. Other executives of the company are Fred E. May, vice president in charge of sales; Richard H. Dempsey, vice president in charge of manufacturing; George E. Williamson, treasurer; Miss Madeline Moses, assistant treasurer; Walter E. Daverin, comptroller and secretary.

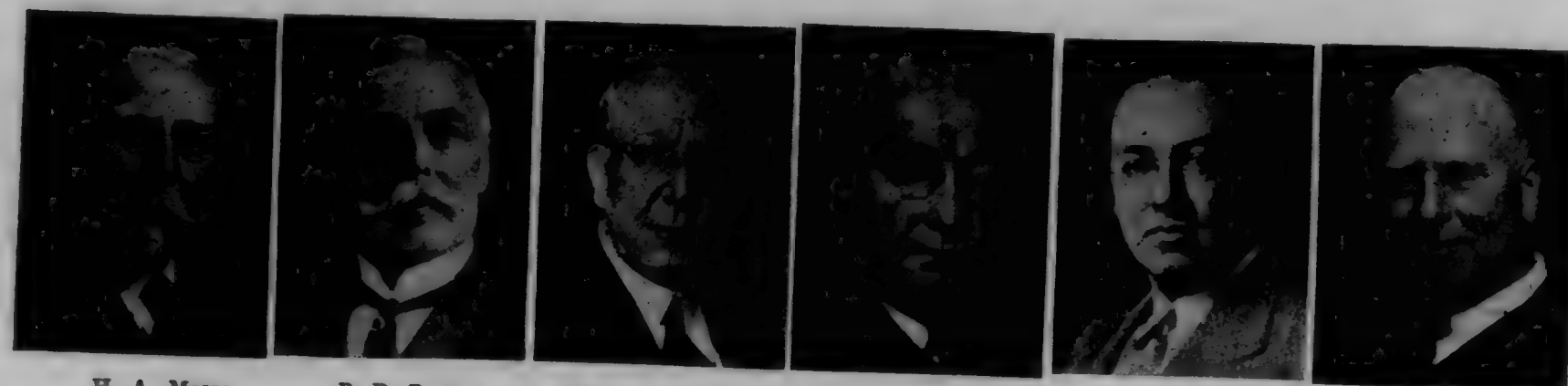
At the present time the mill produces bond and writing papers, ledger papers, index bristols, direct advertising (book and cover) papers, wedding papers and bristols, technical papers and specialties. As a matter of fact, Mr. Rising was reputed to be the first manufacturer of index bristols, and under his management the company early assumed a leadership in this field which has been continued to the present.

One of the first objectives of the new management, when they assumed control of the company in 1928, was to make the mill thoroughly up-to-date. Since that time, the equipment has been completely checked and revised in order that it might have the most modern and efficient features.

Rising has two 94-inch Fourdrinier machines, and has a daily capacity of 50,000 pounds of paper. Water for making Rising papers comes from two artesian wells which are 600 feet deep.



RISING PAPER CO.



H. A. MOSES

B. D. RISING

W. J. RAYBOLD

F. E. MAY

R. H. DEMPSEY

G. E. WILLIAMSON

## Shryock Brothers, Incorporated Philadelphia, Pa.

The Shryock Brothers business had its inception in 1790 when John Shryock founded the Hollywell Mill in Chambersburg, Pennsylvania, to make printing and wrapping papers and later to make banknote paper once extensively bought and used by the United States Government.

In the late eighteen twenties William Magaw interested George A. Shryock in the principle of adapting his patented strawpulp process to the practical manufacture of paper and in 1829 the Hollywell Mill commenced experimenting with the method and it is said of George Shryock that he made paper of every description from wheat, rye, barley, oats and buckwheat straws; from corn blades; a wide variety of grasses; corn husks; white pine shavings; willow wood; refuse tan. He bleached straw to produce a printing paper but with rags at from two and one-half to four and one-half cents a pound it did not pay to bleach straw.

### Early Straw Production

Early records of the Hollywell Mill show that once George Shryock had it in satisfactory operation he boiled up as much as one thousand tons of straw at a time and produced up to thirty reams of paper a day. When the trial period was successfully passed Shryock completely eliminated all manufacture from rag in the Chambersburg mill in favor of the use of strawpulp. A small cylinder machine was installed which George Shryock claimed to be the first of its kind to operate on that material. Later he invented the grooved wood roll for the production of binders boards and box boards. The expanding output led to the construction of a new mill dam, a new drying house and additions to the original building. Four pulp engines were installed and a new steam house with tubs added.

### Magaw Rights Acquired

George Shryock and Nicholas G. Ridgley acquired

the exclusive rights to the Magaw patent for the eastern part of the country and when Nicholas Ridgley died in 1831 the firm of G. A. Shryock & Co. was organized by George Shryock, S. D. Culbertson, Reade Washington and Alexander Calhoun. The new company built the "Mammoth" mill on the Conococheague creek near Chambersburg with one hundred and two miles of drying poles, seventeen large dry presses, eight pulp engines and eight machines with which an output of one hundred pounds an hour was achieved.

### Chambersburg Mill Burned

The Chambersburg mill was burned in 1864 during the Civil War sacking of Chambersburg but at the close of the conflict George Shryock and his brother John started the Papyrus Mills at Shippensburg, Pennsylvania, to manufacture wrappings and boards. George Shryock ran the mill, and John opened an office in Philadelphia to market the output.

### Shippensburg Mill Lost

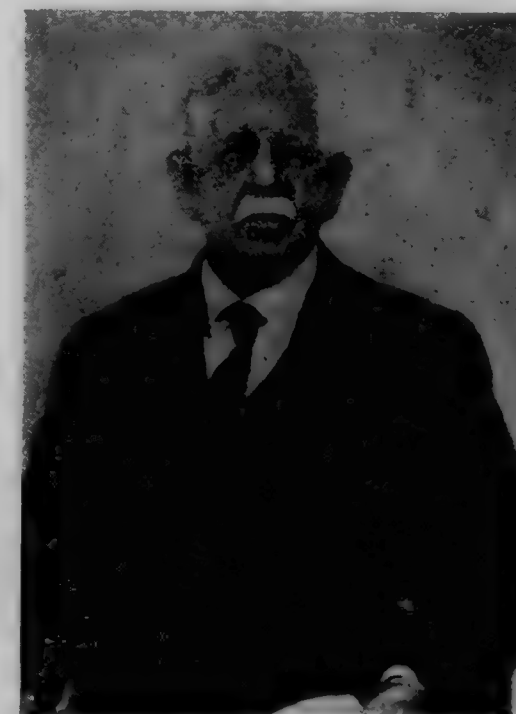
Lightning destroyed the Shippensburg mill in 1898 and shortly thereafter Samuel S. Shryock purchased the Dorlan Mills in

Downingtown and began the manufacture of binders boards.

The business was incorporated in 1909 by Samuel S. Shryock, Sr., Samuel S. Shryock, Jr., Owen A. Shryock and Clarence C. Dorsey. Samuel Shryock, Sr. died in 1926 at the age of eighty-six.

### Present Officers

Present officers of Shryock Brothers, Incorporated, are: Owen A. Shryock, President; S. S. Shryock, Jr., Secretary and Treasurer; C. C. Dorsey, Vice President. The year 1940 is the one hundred and fiftieth anniversary of the company, marking a century and a half of successful operation by members of the Shryock family.



S. S. SHRYOCK, SR.



## Clark-Aiken Co., Lee, Mass.

The forerunner of the present Clark-Aiken Company was established in 1827 in Lee, Massachusetts, when E. P. Tanner began repairing paper mill machinery in the machine shop of a shoddy mill operated by Beach & Royce. In 1828 Tanner bought the machine shop and devoted its full resources to paper mill repair work.

The simple machinery of the mills which had sprung up in the vicinity of Lee since 1816, when hand made paper making had its inception in South Lee, required little more than blacksmithing equipment for their essential repairing and Tanner had this and more. Then, too, he was both a good mechanic and astute business man who intuitively sensed need for new fittings and auxiliary devices. Early records of the business he built show that in a very short while he was supplying vital equipment to mills throughout Massachusetts, Connecticut and adjacent New York State.

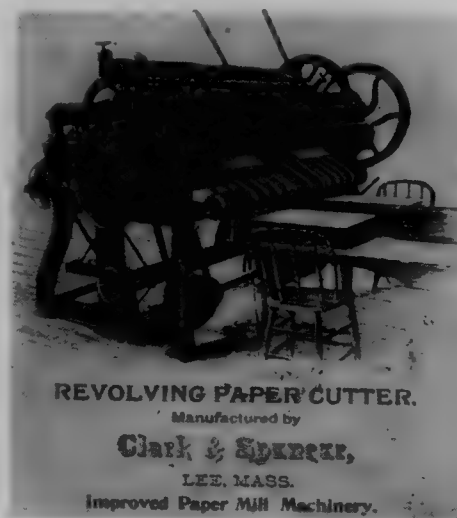
The popular outfit of that period was a single cylinder mould, two small presses and five dryers. Many mills used straw as their pulp material and this development in conjunction with the expanding manufacture of rag papers in the vicinity of Tanner's shop contributed signally to its prosperity.

### Operated as E. P. Tanner & Son

Before Tanner's death in 1886 he had brought his son into the business and operated as E. P. Tanner and Son. After the death of the founder there was a period when the shop was known as Tanner and Perkins but it was the next phase that marked the real development. H. M. Spencer, who learned his trade

in an axle foundry doing a national business, saw opportunities for extending the paper machinery line and bought out the Tanner and Perkins interests.

It was the mechanical skill and foresight of Spencer to which a number of principles in common use today may be directly traced. Perhaps his outstanding creation was the revolving paper cutter which is the great-great-grandparent of the current Clark-Aiken fast cutter.



CUTTING MACHINE DESIGNED BY H. M. SPENCER IN WHICH WERE INCORPORATED ORIGINAL PRINCIPLES STILL IN COMMON USE.

### Later Developments

The later developments of the business are familiar to many throughout the paper industry. H. C. Clark and E. D. Jones had formed the business in Pittsfield which has grown into the E. D. Jones and Son Company. Clark withdrew to buy a half interest in Spencer's machine shop in Lee and changed the name to Clark and Spencer. Later, Spencer sold his half interest to Clark who brought his son in with him and the business became known as H. C. Clark and Son and continued as such until the plant was burned to the ground in 1919.

### Business Reorganized

The business was completely reorganized under the title of the Clark-Aiken Company and, provided with the present modern factory and under the guidance of Walter S. Aiken, it has carried the development of the early machines up to the present production of fine precision devices which contribute signally to successful paper manufacture.



WOODEN BUILDINGS, COMPRISING MACHINE SHOP AND FOUNDRY, AS OCCUPIED BY CLARK & SPENCER PRIOR TO ITS DEMOLITION BY FIRE IN 1919. THE MODERN BRICK BUILDINGS SHOWN AT RIGHT WERE CONSTRUCTED BY REORGANIZED CLARK-AIKEN CO.



## Thilmany Pulp & Paper Co., Kaukauna, Wis.

In 1883, Oscar Thilmany, an American citizen, but a native of Germany, established the Thilmany Pulp and Paper Mills in Kaukauna, Wis., on the Fox River, about twenty miles up stream from Green Bay. These mills were destined to be responsible for the inauguration of many of the important earlier paper-making developments in this country, and continue to be leaders in the specialty field. Initially butter plates were manufactured from ground wood pulp. In 1889 the first paper machine was installed and in October of that year the first paper was being successfully produced. In December, 1891, No. 2 machine was erected to give the mill two Fourdriniers, 82 and 90" respectively, and four beaters. No. 3 machine was built in 1895, No. 4 in 1896, and No. 5 in 1897. These last three machines were so-called "Flying Dutchmen" or "Yankee" Fourdriniers. This type of machine originated in Germany, and Mr. Thilmany worked from modified German plans.

The "Yankee" machine was designed to make paper duplex in character, possessing a high finish on one side, and a comparatively rough surface on the other side. The "pick-up" feature made possible a wide range of basis weights from 10 to 60 lbs. to the ream, 24 x 36. The two-finish effect was produced by the use of a large steam heated drier, or cylinder, in place of the battery of smaller driers common to the ordinary Fourdrinier machine. The operation of that first machine proved so successful that two units were added within a few years.

Increasing responsibilities obliged Mr. Thilmany to add to his small organization. In 1897 he employed C. W. Stribley, who had had earlier experience with the Kimberly-Clark Company, as his manager, and the work of expansion continued on an increasing scale. In 1901 Mr. Thilmany, desiring to retire from active business and return to his native country, sold his mill to the present owners, Thilmany Pulp and Paper Company. Mr. Thilmany was elected its first president, but soon turned over his interests to the new owners. M. A. Wertheimer became the president, and Mr. Stribley, treasurer and a director. The association of these two men continued until Mr. Wertheimer's death in March, 1939.

Mr. Wertheimer had for years been a paper jobber and converter in San Diego, Calif. Among other things he had built up a large business on the Pacific Coast in plain and printed tissue wrappings for citrus fruits and vegetables. With one of his shop men he had designed and built a new type of printing press for that purpose. The Thilmany mills were his chief source of supply for these papers, and his contact with the mill stimulated the development of paper specialties.

Mr. Wertheimer was a man of outstanding business ability, and possessed of a vivid imagination—a rare combination. Under his guidance, and with the help of Mr. Stribley, who had managed the mills almost completely in the later years of Mr. Thilmany's ownership, the business

grew and prospered. These men were responsible for many innovations in the field of special papers. Mr. Wertheimer is credited with pioneering the light weight, strong machine glazed wrapping papers in this country, as substitutes for the heavier and coarser grades. In collaboration with their superintendent, O. M. Farwell, Wertheimer and Stribley conceived the idea of impressing designs on paper at the drier, in the course of manufacture, and with the use of a special marking roll. A patent on this device was granted, and later extended because of improvements, and Thilmany became the first mill to make wrapping papers with surface designs introduced in the dryer chain.

About 1905 Mr. J. E. Thomas left the employ of the Nekoosa Paper Company to join the Thilmany organization. He became vice-president, and contributed greatly to the ever growing business. He died in 1918 at the age of forty-seven, and with his passing the company suffered a severe loss.

In 1911 one of the first sulphate pulp mills in the country was constructed, located adjacent to the paper mills. Designed to make 30 tons of kraft pulp per day, it was enlarged from time to time. Today it has a capacity in excess of 100 tons. One of the first plants to bleach kraft pulp was installed. All of this paved the way for experimentation, and development of papers of unusual strength, pliability, resistance to moisture, and so on. There are included in this group so-called amber glassine and greaseproof, supercalendered papers, etc. Amber waxed carton lining paper, made from pure bleached sulphate pulp originated in the Thilmany mills. It immediately revolutionized packing of crackers and protection of food products where paper resistant to moisture and grease was required. A pioneer in the manufacture of asphalt laminated papers, Thilmany originated Waterproof Liners for container manufacturers, and developed many uses for these particular grades.

In 1916 the company purchased the plant of the Wisconsin Tissue Paper Company at Appleton, Wis., but in 1930 all manufacture was consolidated at Kaukauna. With the acquisition of the Appleton mill, the number of paper machines was increased to seven. In 1930 a new Fourdrinier machine was added, making the total eight machines—three Fourdriniers, and five "Yankees".

Mr. Wertheimer was active in the development of the business for nearly forty years, or until his death in 1939.

Today Thilmany is a major producer of a large number of grades of paper.

The present officers of the company are: President, Karl E. Stansbury; Vice-President in Charge of Sales, E. H. Jennings; Vice-President in Charge of Manufacture, C. R. Seaborne; Vice-President, Marvin Preston; Secretary, E. H. Jennings; Treasurer, C. R. Seaborne. These officers, together with C. W. Stribley, R. S. Wertheimer, and George J. Stansbury constitute the board of directors.



MILL No. 1



MILL No. 2

THILMANY PULP & PAPER CO.



## The Tileston & Hollingsworth Co.

The founding of the Tileston & Hollingsworth Company extends back to Colonial days. Provided with an exclusive franchise, Daniel Henschman, Gillman Phillips, Benjamin Fanuil, Thomas Hancock and Henry Dering rented an old mill which had been built in 1706 at the bridge over the Neponset river in Milton, Mass. Dering was superintendent and Henry Woodman was engaged as foreman. The other members of the company appear only as investors in the enterprise. Not until 1730 was paper regularly manufactured. Jeremiah Smith was engaged to take charge in 1737, and in 1742 he purchased the mill and seven acres of land. An English paper maker, John Hazleton, was hired as foreman.

In 1760, James Boies, son-in-law of Jeremiah Smith, became acquainted with Richard Clark, a practical paper maker, and persuaded him to go to work for Mr. Smith. Five years later, Boies erected a paper mill in Milton. He took for his partner Richard Clark and business was done under the firm of Boies & Clark. Within a short time Boies built a second paper mill opposite his first mill, in which Clark had no interest. In 1771, Boies sold a half interest in this mill to his son-in-law, High McLean and the firm became Boies & McLean. The original paper mill which Clark left to become associated with Boies, was continued by Jeremiah Smith until 1769 when he sold a half interest to another son-in-law, Daniel Vose. When Smith retired, Vose became sole owner and conducted the mill successfully for over twenty years.

Boies & Clark had been an offshoot from the original mill and it is through the succession of their interests that we come to the founder of the Tileston & Hollingsworth Company. In 1777, Boies and McLean consolidated the two mills. Michael McCarney was admitted in 1782. Fire destroyed the mill in that year and it was rebuilt and also a new chocolate factory on the Dorchester side of the river, which was later converted into a paper mill. In 1793, Jeremiah Smith Boies built a new mill further up the river to combine the manufacture of chocolate, flour and paper. He hired Mark Hollingsworth to take charge of the paper making.

Mark Hollingsworth was then about sixteen years old. In 1801, Hollingsworth formed a partnership with Edmund Tileston and Boies rented the mill to them. Fire destroyed the mill in 1805. In 1809, the young men leased two other mills, one of them had been rented to George Bird, founder of Bird & Son, of East Walpole, Miss. The other mill was known as the Gillespie Mill. In 1817, the old Boies chocolate mill was converted into a paper mill by Tileston & Hollingsworth. In 1774 they acquired another paper mill at the Lower Falls and in 1823 the firm leased the Charles Baker & Company's mill.

The Tileston & Hollingsworth Company continued to expand and in 1831 a son of each partner, Edmund

P. Tileston and Amor Hollingsworth, were admitted to the firm. Edmund Tileston, senior, died in 1839 and Mark Hollingsworth retired the following year. In 1836, the William Summer Paper Mill was purchased. The business continued to be conducted in a highly successful manner for many years. In 1860, Frank L. Tileston, son of Edmund P. Tileston, and Amor L. Hollingsworth, was admitted to the firm. The young men were ambitious and directed John L. Seaverns of Worcester, Mass. to produce the best machinery possible and the resulting Eagle Mill was known for the high quality of its products. The equipment included a 76-inch Fourdrinier and beaters of two to three hundred pounds' capacity.

Amor Hollingsworth died in 1872 and his son, Amor L. Hollingsworth, inherited his father's estate, which is now the property of the latter's nephew, Amor Hollingsworth, the present head of the Tileston & Hollingsworth Company. Frank L. Tileston died in 1885, leaving his interest to his brother, John Boies Tileston. From this period there follows a long period of successful operations. In 1879, important improvements were added and steam power was installed. In 1881, manufacture of paper was discontinued at the old Fuller Mill and the 72-inch Fourdrinier was moved to the Eagle Mill, where one of the first Jordan engines was set up in 1887. This was the invention of Joseph Jordan, according to Robert Mossman, for many years superintendent with the Tileston & Hollingsworth Company. Jordan had worked for the Ivanhoe Paper Company, of Passaic Falls, N. J., and the idea occurred to him while looking at some discarded speed cones in the mill yard. Super calenders were also installed in the same year. Increased business led to additions to the Hyde Park Mill. At the death of Mr. Tileston in 1898, George F. Child succeeded him. In 1905, the responsibilities of management passed to the fourth generation of the Hollingsworth family.

The present officers of the Tileston & Hollingsworth Company are: President, Amor Hollingsworth; vice-president and assistant treasurer, Arthur V. Howland; treasurer, E. H. Clapp.

The Gillespie Mill of the company made a special blue sugar loaf paper, in the manufacture of which ground logwood was used for coloring. In this respect, the company is probably the first or among the earliest users of groundwood. The Summer Mill, achieved an enviable reputation for lithograph, etching, chart and plate paper. The Eagle Mill was largely devoted to the production of fine book papers and made for many years a special blue wrapping paper for the Walter Baker Chocolate Company. Quality, rather than quantity, is the company's ideal today as it has been in the past. The Tileston & Hollingsworth Company is now in its 120th year as a corporate entity.

## Waldorf Paper Products Co., St. Paul, Minn.

The Waldorf Paper Products Company was established in 1886, at St. Paul, Minn., in that year 1886 a partnership, known as the Baker-Collins Company, was formed, occupying a small loft at 125 East Third street. Its principal business was job printing. This was the beginning of the present Waldorf Paper Products Company. The partnership expanded, and in 1891 it was incorporated as the H. L. Collins Company. Its first officers were H. L. Collins, president, M. R. Conable, treasurer, and M. W. Waldorf, secretary.

As the company grew it added new departments, among them an office stationery store, a druggist label department, a book bindery, and a badge and banner department. The addition of these departments required additional space, and by 1900 the company was occupying a five-story building which was built for them according to their needs by D. R. Noyes. The new factory was located at 61-67 East Tenth street and was ready for occupancy in January, 1901. At this time the label and folding box departments were added. These were the departments that gave the company the foundation on which the present business was built.

Under the able management of M. W. Waldorf, the folding box and label departments grew to such extent that the other lines were dropped, and the entire energy of the organization was devoted to the printing of labels and manufacturing of folding boxes. The next four years showed phenomenal growth, and by 1905 it was decided that more space was needed. Looking into the future a site was picked in the new industrial district located in the Midway between the cities of St. Paul and Minneapolis. Here was built the modern factory type building covering an area of 70,000 square feet all on one floor and equipped with the most modern machinery for printing labels and manufacturing folding boxes. This new building was occupied in the spring of 1907 and was the first unit of the present Waldorf Paper Products Company plant.

The demand for the folding cartons and paper shipping containers was growing rapidly, so in 1907 Mr. Waldorf and his associates formed the Waldorf Boxboard Company for the purpose of erecting a boxboard mill to furnish board for the rapidly growing box plant. The company was incorporated with M. W. Waldorf as president, C. P. Noyes as vice-president, H. L. Collins, secretary, and Douglas Putnam, treasurer. Land was purchased adjoining the H. L. Collins Plant on which were erected buildings large enough to house a two-machine mill. The first machine installed was a 110" trim cylinder machine with all the necessary auxiliary equipment. This property was completed October, 1908, and had a capacity of 40 tons of boxboard daily.

In 1909, the company started in a small way to make corrugated and solid fibre shipping containers, buying the sheets from the Chicago Mill and Lum-

ber Company. However, by 1911 the department had grown to such an extent that a 110" paster for fabricating solid fibre board and wallboard was installed, and in 1913 the first corrugating machine for making corrugated boxes was added. Also, during this year, because of the growth of these two new departments, the second board machine was added.

Located in a territory in which the public had not been educated to saving waste paper, the company experienced difficulty in obtaining raw material in an adequate quantity; therefore in 1912 the men interested in this business bought the American Scrap Iron and Metal Company of Minneapolis and the West Side Paper Stock Company of St. Paul and formed a new corporation known as the American Paper Stock Company which took over the business of the acquired companies. To handle efficiently the collection of waste paper, a new building was built adjoining the boxboard mill, and here was set up the waste paper sorting operation which has served the company well. By 1917, it seemed wise to consolidate the paper stock, the mill, and the box departments under one management for the greater efficiency of the operation. At this time the Waldorf Paper Products Company was formed with M. W. Waldorf as its president, Paul N. Myers, vice-president, (who had purchased the interests of H. L. Collins and others in the year 1915) and Douglas Putnam, secretary and treasurer.

Again in 1929, the company suffered the loss of its president, Paul N. Myers, who had been very aggressive and added much in building the company, died very suddenly, and in his place Homer P. Clark, one of the directors of the company since its organization, became its president. All the other officers remained the same with the exception of Paul A. Schilling, who was elected secretary and general manager. In 1931, Douglas Putnam, who had been treasurer of the company since its incorporation, retired, and Paul A. Schilling was elected secretary-treasurer.

During the period of 1930-34 the company did much to improve its manufacturing facilities in all departments. At this time the management increased its production so that by 1934 it had a capacity of 350 tons per day. In 1934, the 126" paper machine of the Minnesota & Ontario Paper Company was purchased and installed in the strawboard division. In 1933, Homer P. Clark was elected chairman of the board, Paul A. Schilling, president and treasurer, H. C. McDaniel vice-president and secretary, C. G. Maher, F. G. Reicher, and A. J. Waldorf, vice-presidents.

The present officers of the company are Paul A. Schilling, president and treasurer, H. C. McDaniel, vice-president and secretary, C. G. Maher and A. R. Penfield, vice-presidents.

During the years 1936-37 the further expansion of the company's products was the entering of the paper oil can and paper coat hanger fields.



## West Virginia Pulp & Paper Co., New York

The cornerstone of the West Virginia Pulp and Paper Company may be said to be a certificate awarded to John Luke of Aberdeen, Scotland, granting him a master's degree from the Association of English and Scotch Paper Makers, on February 22, 1826. In 1852, William Luke, son of John Luke, came to America and became associated with the paper industry. He and two of his sons, John and David, later formed what is known today as the West Virginia Pulp and Paper Company.

The initial step in building the large industrial enterprise of the present time was taken in 1888, when a charter was given for the erection of a mill at West Piedmont, now Luke, Md., across the Potomac River from Piedmont, W. Va. The first organization was known as the Piedmont Pulp and Paper Company. The officers of the company were: William Luke, president; John G. Luke, vice-president and general manager, and David L. Luke, secretary and treasurer. A mill was built at West Piedmont for two paper machines. Production at the start was confined to the manufacture of manila wrapping paper on one 92-inch Fourdrinier machine.

In 1892, a third company, known as the West Virginia Pulp Company, was founded and a sulphite plant was built at Davis, W. Va. The three corporations were consolidated in 1897 under the name of the West Virginia Pulp and Paper Company, with the same officers as the original company.

The notable growth of the company has continued from its beginning. In 1899, the West Virginia Pulp and Paper Company acquired the Morrison & Cass Paper Company of Tyrone, Pa. This is now known as the company's Tyrone Mill, a four-machine plant.

The next step was the construction of the Covington plant, at Covington, Virginia, which was begun in 1899. This plant consists of a sulphite pulp mill, a soda pulp mill, a seven-machine paper mill, and two board mills with three machines for making fiber board and liner board.

In 1904, the Duncan Mill at Mechanicville, N. Y., was added to the West Virginia Pulp and Paper Company. It comprises a sulphite pulp mill, a soda pulp mill and a six-machine paper mill. In 1906 the company acquired the Williamsburg Paper Manufacturing Company at Williamsburg, Pennsylvania, consisting of a soda pulp mill and a two-machine paper mill.

In 1937, the new Charleston, South Carolina, plant was opened. This mill has one Fourdrinier board machine which produces 350 tons a day of Kraft Liner Board.

The rated capacity of the company's six mills is 1400 tons of pulp and 1550 tons of paper and board daily. Thirty machines are in operation. The eleven coating machines at Luke, Md., have a capacity of 80 tons of coated paper a day. Each of the company's mills is a self-contained unit, manufacturing its own pulp and where needed, its own soda and

chlorine for bleaching. Each mill maintains its own laboratory and engineering division. Adequate supplies of pulp wood are available at each of the mills and an ample water supply is assured.

The company maintains independent and coordinating control in the research laboratories in each of its paper mills, which coordinate in turn with the research laboratory and engineering division in New York. The company regards this work as highly important to the continued advancement of its products.

The large volume of the company's products is distributed directly to more than 1300 major accounts, through sales offices in New York, Chicago, Philadelphia and San Francisco. Distribution is made to thousands of printers and other users of paper by ninety distributing merchants and sold in many foreign countries under the brand names of the various papers. Advertising is done in leading printing, lithographic and other allied trade magazines, augmented by direct mail campaigns. Its own publication, "Westvaco Inspirations for Printers," now in its

sixteenth consecutive year, is distributed throughout the United States and in many foreign countries.

The present officers of the company are: Thomas Luke, president; David L. Luke, vice-president; John R. Miller, vice-president; Sidney M. Phelan, vice-president; Adam K. Luke, vice-president and treasurer; Elmer S. Johnson, assistant treasurer; Charles A. Cass, secretary, and Henry L. Condit, assistant secretary.

The West Virginia Pulp and Paper Company has gradually broadened its line of papers. The relative proportion of the grades of paper it manufactures is approximately as follows: paper for magazines and publications, 18 per cent; trade and religious, 6 per cent; books and school books, 4 per cent; printers papers, 9 per cent; paper for converting, 6 per cent; miscellaneous paper, 7 per cent; and kraft papers and kraft boards, 50 per cent.

In addition to the large sales volume of its main products of paper and paper board, the West Virginia Pulp and Paper Company markets a substantial amount of lumber. Its sales of by-products are also important and include caustic soda, chlorine, chalk, oleic acid, abietic acid, activated carbons, resin, turpentine, cymene, ethyl alcohol and methyl alcohol.

The company manufactures and distributes a varied line of high grade printing and special papers including, enamel, litho, super, super plate, Westvaco super school book and super rotogravure, Westvaco super litho, Inspiration English finish, Westvaco English finish rotogravure and school book, Westvaco opacity and gumming, Inspiration poster and offset, Clear Spring text wove and laid, Westvaco hibulk, Westvaco bond, mimeograph wove and laid, Inspiration, Mada and Covmont tablet, Westvaco white writing, Inspiration envelope and ledger, Westvaco foil lining, Westvaco playing card, post card and tile stock, etc.



JOHN LUKE



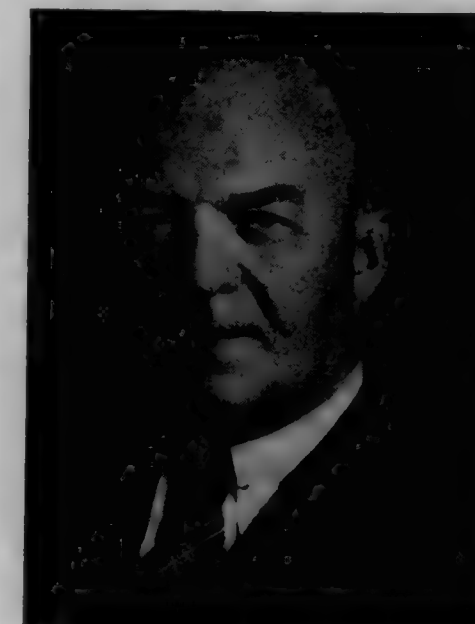
WILLIAM LUKE

## Perkins-Goodwin Co., New York

The firm of Perkins-Goodwin Co. was founded in 1846 by Coe S. Buchanan as a paper stock business and operated by him until 1865 when he admitted George F. Perkins and Edward Goodwin as partners, conducting the business under the firm name of Buchanan, Perkins & Goodwin with offices at 43 Dey street, New York.

In 1869 Buchanan retired and the firm continued as Perkins & Goodwin until 1881 when Frank Squire and J. Fred Ackerman were also admitted as partners. The firm name was then changed to Perkins Goodwin & Co. with offices at 84 Duane street. Goodwin died in 1895, Perkins retired in 1904 and Squire in 1905. On January 1, 1906 it was incorporated as Perkins-Goodwin Co. with Ackerman as President.

By that time a sizable paper business had been established. The same year the firm became the sole agents for the famous old English paper house of John Dickonson & Co. A little later they took over a line of Bible and India papers from another old English firm, Leopard & Smiths, Ltd. In 1908 John H. Duffy became president and on



LOUIS CALDER

his retirement in 1918 was succeeded by Eugene F. Crowe on whose death in 1921, Louis Calder, the present president, took over.

The firm was now very well established as paper merchants specializing particularly in publication papers such as newsprint, book and magazine. It now began to extend its activities into the wood pulp field acquiring various agencies of Scandinavian, Canadian and Domestic pulp producers.

In 1929 the company absorbed the firm of Scandinavian Pulp Agency, Inc., which had been sales agents in the U. S. A. for a large number of Scandinavian pulp mills; thus, the present firm became also one of the largest distributors of wood pulp in the country.

With the development of the paper industry in the South, the company, in 1937, initiated negotiations which resulted in the construction of the first newsprint mill ever built in the South. The mill began operations in January 1940 as the Southland Paper Mills at Lufkin, Texas, and is now producing newsprint made entirely from Southern wood.

## Brownville Board Co., Brownville, N. Y.

The Brownville Board Company, Brownville, New York, located near Watertown on Black River, was incorporated February 25th, 1901, by J. Munson Gamble, C. Willard Gamble, Blanche C. Gamble, for the purpose of manufacturing various types of cylinder machine groundwood and sulphite boards. The boards ultimately manufactured included tags, oyster and ice cream pail, solid manilas, folding boards, etc. The mill structure was poured concrete, one of the first concrete buildings in the locality.

The machine was an 112" four cylinder, with a production of approximately twenty tons per day, and a groundwood mill of the same production, both of which have been increased by additions and improvements until now the production is about double the original tonnage.

J. Munson Gamble and his brother, C. Willard Gamble, operated the plant until, following the death of C. W. Gamble in 1905 Matthew M. Bagg came from the Newton Falls Paper Company to serve as Secretary and Treasurer until 1915 when he resigned.

D. Foster Phillips, also from the Newton Falls Paper Company, joined the staff in 1911 and upon Mr. Bagg's resignation in 1915 became a Director and Secretary.

In 1927 Morse G. Dial became a Director and Vice President, succeeded in 1929 by Willard S. Gamble son of J. Munson Gamble, who became a Director and Vice President on the resignation of Mr. Dial.

W. S. Gamble continued as Vice President until 1936 when, upon the resignations of J. Munson Gamble and Blanche C. Gamble as Directors, he was elected President and Manager; Robert G. Horr succeeded as Vice President.

In 1930 Lawson Ramage joined the Company as Manufacturing Consultant and Assistant to the President, but resigned later.

The superintendents employed during the life of the Company have been: J. A. Fisher, Robert Almstead, Fred Gleesettle, Sr., J. H. McLaughlin, James O'Hara, Fred Frye, D. F. Lawlor, John Brougham, James Quinn, William Sievert, Robert J. Nichols.

The present directors and officers are: Willard S. Gamble, President; Robert G. Horr, Vice President; Ethelwyn G. Dial, Vice President; Dr. Walter S. Atkinson, Treasurer; D. Foster Phillips, Secretary. The staff also includes: Jermain B. Porter, Sales Manager; B. Quinn Hanchette, Accountant; R. J. Nichols, Superintendent; Mrs. Robert Witt (nee Ek-lund), Personal Sec.; Merrill Dupee, Chief Chemist.





## Parsons Paper Company Holyoke, Mass.

Parsons Paper Company was founded in 1853 by Joseph C. Parsons, who was at that time operating a small paper mill in Suffield, Connecticut. He had been a paper maker for some years before he built the first Holyoke mill. In 1840 he was Agent for the Ames Paper Mill in Northampton, Massachusetts. He left this position in 1843 to take charge of a mill in South Hadley owned by D. and J. Ames. In 1846 this mill was destroyed by fire and Mr. Parsons bought a hand mill at Suffield, Connecticut, which had two vats with a capacity of ten reams of writing paper a day. Soon after he acquired this property, he converted it into a machine mill to make one-half ton per day.

### Possibilities for Cheap Power

The building of the Holyoke dam offered possibilities for cheap power that Mr. Parsons was quick to recognize and he associated himself with Aaron Bagg, Whiting Street, Broughton Alvord, Cyrus Frink and Chester W. Chapin to build the Parsons Paper Company on the third level canal in 1853. Various kinds of paper were made in this the first paper mill in Holyoke.

As the business prospered and the organization grew the following well-known papermakers became

associated with the company: J. S. McElwain, M. C. Pfahler, Edward P. Bagg, Charles R. Randall, Edwin C. Weiser and William McCorkindale. Upon the death of Mr. Parsons, he was succeeded as Agent by J. S. McElwain. Under his administration one of the largest and best equipped mills for the manufacture of bonds, linens and ledgers was erected on the first level canal, Sargeant Street, Holyoke. The capital stock was increased from \$60,000, to \$360,000.

### New Mill Continued

With the formation of the American Writing Paper Company, the old Parsons Paper Company property on the third level canal was sold to them, together with the real estate owned by the Parsons Paper Company at that time and the new mill on Sargeant Street was continued.

### Present Officers

Mr. McElwain was succeeded as Agent by Edward P. Bagg in 1893. Upon his death in 1931, George A. Eastwood became General Manager until his death in 1936. John L. Bagg is the present Vice-President and General Manager; Aaron C. Bagg, President; Elmer B. Cooley, Treasurer; Albert S. Canfield, Secretary.

## Millers Falls Paper Company Millers Falls Mass.

The Millers Falls Paper Company was organized in 1902 by a group of Holyoke papermakers mostly connected with the Parsons Paper Company. E. P. Bagg was elected the first President and C. S. Hemingway, Treasurer and Manager, with A. Finlayson as Superintendent. Incidentally Mr. Finlayson is the only surviving member of that original group.

### Cylinder Machine First Installed

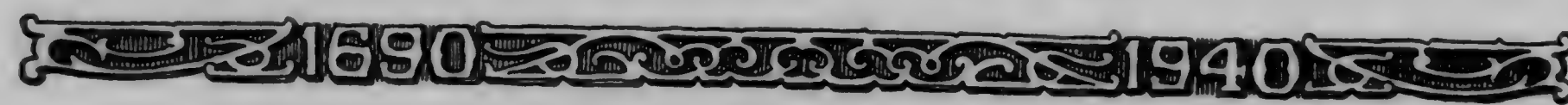
At first it was a cylinder machine mill making covers and deckle edge papers but a Fourdrinier machine was soon added enabling the company to enter the bond, ledger and bristol field. Due to the steady increase in business it was necessary to install a second Fourdrinier and enlarge the plant proportionately. This occurred in 1908 and 1909. The cylinder machine together with the cover paper business

was sold in 1909 thus enabling the company to concentrate on the other grades of paper.

Mr. Hemingway resigned in 1904 to be succeeded by Angus Cameron as Treasurer and Manager. He continued to thus serve the company until his death in 1920. The present manager, J. L. Bagg, was elected in his place and has held the position ever since, and was also elected President on the death of his father, E. P. Bagg, in 1931.

### Production Steadily Increased

The production capacity of the mill has been steadily increased so that today with a new hydro-electric station developing 1300 h.p. and enlarged paper machines running nearly twice their former speed, the yearly output is equal to eight million pounds of rags and sulphite papers.



## Wm. E. Hooper & Sons Co., Philadelphia, Pa.

Wm. E. Hooper & Sons Co. was established in 1800 at Philadelphia, Pa. This company is one of relatively few concerns in the United States with a life history of one hundred years or more during which the business has remained under control of the same family. This company operates the big Hooperwood Textile Mills at Woodberry, Baltimore, Md., producing a wide range of cotton goods and specializing in the manufacture of cotton dryer felts for the requirements of the paper industry.

### William Hooper Arrives in America

About the time Louis Roter was perfecting the patents on the first Fourdrinier machine in France, and 31 years before the machine was destined to change the entire art of paper-making was introduced in America—the youth, William Hooper, arrived in this country seeking his fortune in the new world. But at that time it was not paper-making, but, rather, the appeal of cotton sails for wooden ships to replace the flax sails made in England that brought about the beginnings of the firm of Wm. E. Hooper & Sons, a firm which later was to pioneer in the manufacture of cotton dryer felts needed for the new, continuous paper-making machines; and to grow with the industry as a supplier of a large proportion of the machine clothing used today.

The early history of Wm. E. Hooper is as colorful as the age in which he lived. By 1800, Yankee clipper ships sailing into Baltimore had given this port world-wide fame as a shipping center. Equipping these vessels with sail had created a large and specialized industry. Wm. Hooper followed the custom of that time and apprenticed himself to a sail-maker named Hardester. Before long, the ambitious young man had started in business for himself, taking in his former employer as a partner, and established the firm of Hooper and Hardester, sail-makers, a name subsequently changed to Wm. E. Hooper & Co., and then to Wm. E. Hooper & Sons Company.

### Business Prospered from Start

The business prospered from its start and in 1843 the founder retired in favor of his eldest son, Wm. E. Hooper. The boundless determination and enterprise of this young man and his ambition to further the interests of his company are illustrated by the fact that to secure orders for sails he would row down to the mouth of the Patapsco or often farther down the bay to meet in-coming clipper ships, often rising long before daybreak in order to be the first Baltimorean on board.

### Found Another Channel of Business

His energies soon sought and found another channel of business in addition to his sail loft; he became one of the city's largest purchasers of cotton which he then secured via Norfolk. Among others he supplied his contemporaries Gambrill and Carroll when they began the production of cotton duck at Woodberry, with their entire requirements and sold their entire output in competition with duck brought from England. Within a few years Wm. Hooper purchased co-partnership rights in the firm of Gambrill and Carroll and later bought out this firm, placing it in his own name. During this time the business was considerably expanded and two new mills were added. In 1873 this energetic indus-

trialist died and was succeeded by his eldest son, James E. Hooper.

The third Hooper had much to do with eliminating the evils of child labor. Baltimore's early cotton duck plants were operated, between 50 and 75 per cent, by boys and girls between 6 and 12 years of age. These children, in addition to women, did about six-sevenths of all the work, which was so simple that the looms could be tended by women and the spinning frames by children. There was nothing unusual, however, in this employment of children in manufacture at this time; it was the universal custom. The hours of labor were from twelve to thirteen and the pay was very low.

Against these accepted conditions, James E. Hooper was in complete opposition. He was one of the first to seek betterment of the condition of his workers. He was one of Maryland's first advocates of a Child Labor Law. In 1873, he ran for Legislature in order to further his ideas in this particular. About this time the various mills agreed to employ no girl under 12 years of age, but it was not until 1880 that there first appeared a law on the Maryland Statute Books declaring "No child under 16 shall be employed in factories more than ten hours per day."

### Interest in Workers

Around the early cotton mills, villages invariably sprang up, dependent on the factories for their existence. The mill-owners became the patriarchs of all the families. James E. Hooper interested himself in making the lives of his workers more pleasant and healthful. He even went so far as to build a hotel in Woodberry for female workers in his factory, providing, at only \$10 per month, board and comfortably furnished apartments with individual beds and other luxuries that were unusual in those days. However, interest in the welfare and happiness of his and other workers and the time and effort devoted to this work did not prevent Hooper from developing his firm's activities. In 1904, with the assistance of his son William, he built the present Hooperwood Mill No. 1.

### Keep Pace With Improvements

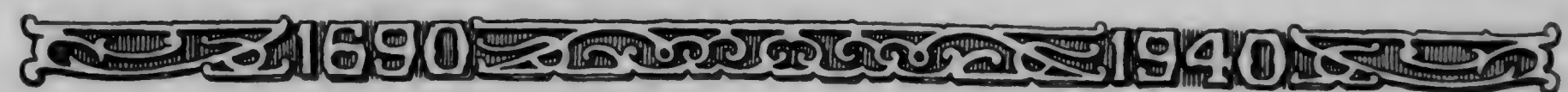
James E. Hooper died in 1908 and was succeeded by his second son, William E. In 1917, during the period of the world conflict, William's interests were purchased by his two brothers, Robert P. and James P. Hooperwood Mills No. 2 and 3 were next completed, enabling the concern to augment its business greatly. In the years following the conflict, the company has kept pace with improvements in manufacture that have practically revolutionized the textile industries mechanical processes.

### Intrigues Imagination

One machine in particular intrigues the imagination. Into the weaving of its 252-inch wide cotton drier felt goes separate threads supplied by 32,000 spools. An immense complicated and involved piece of mechanism occupying space sufficient for a fair-sized dwelling, guides 32,000 threads moving simultaneously in orderly fashion. Hooperwood Mills normally give work to more than one thousand employees and at the present time are working very close to maximum capacity.



PLANT OF WM. E. HOOPER & SONS CO.







## The Aldine Paper Co., N. Y. C.

The Aldine Paper Company was established sixteen years ago, November 1, 1924, with its founder, Harry E. Gould as President and Treasurer from the very inception. His experience in the paper merchant field covers a period since about 1914, when he was hired by the late Max Greenebaum, of Beekman Paper and Card Company as office boy and clerk. The early training under this man, who had tireless, dynamic energy, has been responsible not only for the birth of Aldine Paper Company, but many other paper merchants, including Schlosser Paper Company, William G. Willmann (its present officers), Baldwin Paper Company, Commercial Card & Paper Co., and several other paper companies.

The Aldine Paper Company was originally established at 1270 Broadway, with warehouses on Greenwich Street. In 1927, due to expanding business, the firm removed to 333 Hudson, one of the first paper companies to come to this section which has since become a real paper centre. The warehouse and office were combined, and the space occupied was well over 20,000 square feet.

Steel shelving and all modern equipment were installed, a far cry from the old days when Beekman Street was the paper merchants' centre, and cases of paper had to be hoisted up by cable, before elevators were installed in buildings.

There were no mill brand papers at that time and printers were at wits' end trying to match samples for

printing jobs. Consequently a great deal of the paper business was over the counter. When the long-drawn-out procedure with its waits and lack of system are compared to the well planned mill brand papers, sample books, helpful hints for layout, design, color, and so forth offered today by the paper merchant it is plain to be seen that the paper business has shown vast strides forward.

Mr. Gould vividly recalls the World War period with its scarcity of paper and pulp, and the necessity of putting customers on an allotment basis. In comparison, the present war period and the outlook for the future during disturbed world conditions give every reason to believe that both mills and merchants have learned many lessons from the period of 1917 to 1929, so that there is little likelihood of conditions getting out of hand.

In 1936, due to increased business and a rapidly changing policy of handling large contract requirements and specialty business, the Aldine Paper Company moved to its present quarters, at 373 Fourth Avenue.

These spacious quarters, decorated by William Saulter one of the leading decorators in the east, are among the best appointed offices in the country. Doors on both sides of the reception room lead to a series of conference rooms reserved for the use of customers, where meetings may be held without the interruption of telephone calls. Various members of the staff occupy offices decorated in modern style.



H. E. GOULD, ALDINE PAPER COMPANY'S PRESIDENT, WHOSE OFFICE WALL VENEER WAS IMPORTED FROM JAPAN.

## The Walker-Goulard-Plehn Co.

The Walker-Goulard-Plehn Company of New York City actually dates back to 1855 when Maurice O'Meara opened an office at 18 Thomas Street. Shortly thereafter he moved to 27 Center Street where the business remained for some while before going to 277 Water Street. In 1880, sixty years ago, it moved to the present location at 448 to 452 Pearl Street.

Maurice O'Meara remained sole owner of the business until in 1900 it was incorporated with the founder as President and his three sons, Maurice, Jr., William and David as Vice President, Treasurer and Secretary, respectively.

When Maurice O'Meara, Sr., died in 1910 the

Presidency passed to Maurice O'Meara, Jr., whose brother William then became Vice President and Treasurer and the other brother, David, continued as Secretary. At that point Elwin Walker, who had been with the house since 1907, became Assistant Treasurer.

Thomas Goulard became affiliated with the company in 1905 and Robert Plehn joined it in 1906. In 1927 the Maurice O'Meara Company was dissolved to be succeeded by Walker, Goulard, Plehn Company. Today David O'Meara is Chairman of the Board; Thomas Goulard, President; Elwin Walker, Treasurer; Robert Plehn, Vice President; Gustav Schneider, Secretary.



## Taylor-Styles Co., Riegelsville, N. J.

Taylor-Styles & Co. of Riegelsville, N. J., in 1863 commenced making knives for the paper and woodworking industries and from this line of production developed a rag cutter.

There is some uncertainty as to exactly when the first Taylor-Styles all metal cutters began to displace the wooden framed hay and ensilage cutters for cutting rags but it is known that by 1875 their Giant cutter was already well known in the American paper industry.

Throughout the intervening years the line has grown until today it takes in a wide range at one extreme of which are moderate capacity cutters used by fine mills to cut cotton and

linen rags into fairly exact squares and at the other extreme are five to eight tons an hour units used by manufacturers of roofing and felt papers.

Various types of cutters built by Taylor-Styles are used in the reclamation of rubber; manufacture of glue; plastics cutting; cutting pulp and fibers to exact lengths and for making paper excelsior; destroying correspondence, coupons, tickets and so forth. The line also includes a portable pulp shredder.

The present secretary of Taylor-Styles and Company, H. W. Griffin, has been active in the affairs of the company for some forty-four years.

## Lobdell Car Wheel Co., Wilmington, Del.

The Lobdell Car Wheel Company of Wilmington, Delaware, was established prior to 1830 when Jonathan Bonney started an iron foundry in which to make car wheels for the newly formed Baltimore & Ohio Railroad. About 1830 he formed a partnership with Charles Bush under the style of Bonney & Bush. The partners built a new foundry and machine shop at Second and Lombard streets. In 1832 George G. Lobdell, Sr., a 14-year-old nephew of Jonathan Bonney, commenced an apprenticeship and early displayed a natural aptitude for foundry work.

In 1836 when the foreman of the shop fell ill while Bonney

was away from Wilmington, eighteen-year-old George Lobdell was put in charge and continued as the active head of foundry and machine shop.

When Jonathan Bonney died in 1838 his nephew assumed his former interest in the partnership and operated the business under the firm name of Bush and Lobdell which was maintained until 1871 when the present corporate title, "Lobdell Car Wheel Co.," was adopted. After the death of William W. Lobdell in 1914, George G. Lobdell, Jr., succeeded to the presidency of the organization and now, twenty-six years later, still occupies that post.

## Frederick Iron & Steel Co., Frederick, Md.

The Frederick Iron & Steel Company of Frederick, Maryland, after twenty years of specializing in paper mill pumps, have built up a wide range of pumps for every paper mill service where the centrifugal type is applicable; including general mill supply, boiler feeding, condenser circulating, hot water circulating, white water, all consistencies of stock, bi-sulphate and caustic liquor, black liquor, lime water, blow pit and other applications.

There is a heavy duty stock pump equipped with wide non-clog impeller and provided with renewable adjustable wear-

ing plates in both sides of the impeller. These liner plates may be adjusted externally.

Frederick has also developed a vertical pump, suitable for pumping to the head box, provided with steep head-volume curve affording steady flow to the machine.

Pumps have been developed by the Frederick organization in all iron construction, bronze fitted, all bronze, stainless steel or practically any metal or alloy required for any special application.

## T. B. Wood's Sons Co., Chambersburg, Pa.

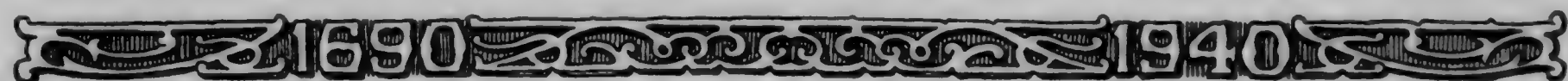
T. B. Wood's Sons Company, Chambersburg, Pennsylvania, was established in 1857 at a time when the American paper industry was developing into manufacture requiring specialized machinery.

For eighty-three years the Wood's Company has specialized in power transmission machinery; its designers and engineers constantly improving and developing for the paper

manufacturers a heavier line than usually sold for transmission machinery.

In 1940 their line includes bearings, clutches, couplings, contractors, hangers, pillow blocks, pulleys, v-belt sheaves and complete drives.

Recent additions in new machinery and plant facilities provide enlarged production and speedier deliveries.







## Riegel Paper Corp., Milford, N. J.

In 1862, at an expenditure of \$27,000, John L. Riegel and Amos Davis built a paper mill at Finesville, N. J. With a daily capacity of one ton of newsprint. A few years later the mill was changed over to the manufacture of strawboard and moved to Riegelsville, N. J., where the Riegel grist mill and sawmill were located. The grist mill, built in 1823, has been continuously operated by the Riegel family until just recently.

### Advent of Machine

John L. Riegel came into the industry just as it was entering a new era. Prior to 1804, when the Fourdrinier machine was invented, all paper had been made by hand. During the first half of the 19th Century the increasing output, largely due to the development of the paper machine, made it evident that new fibres must be found as the supply of rags, the only fibre then in general use, was rapidly becoming inadequate. Not until the 50's were processes discovered for utilizing straw, wood and jute. As a consequence of this development, the industry offered a splendid opportunity to John L. Riegel and he was one of the first to experiment with the new fibres.

### Drop Warren from Firm Name

In 1867 his son Benjamin was admitted to partnership and the firm became John L. Riegel & Son. In 1873, with three additional partners, they incorporated the Warren Manufacturing Company in order to build another mill but this name was changed in recent years to Riegel Paper Corporation in the interest of simplicity and better identification. The new mill was completed at Warren Glen in 1873 and contained



MILFORD, N. J., MILL OF RIEGEL PAPER CORPORATION



the second Fourdrinier paper machine. The mill was laid out for straight line production and immediately prospered. An additional machine was added and in 1889 a third mill was built at nearby Hughesville.

### Fourth Mill in 1907

A fourth mill was started at Milford in 1907, and these four mills, vastly enlarged and changed, now comprise the manufacturing end of the company. Today their eleven machines turn out over 230 different kinds of paper for packaging, printing and special industrial uses. The straight line production of the Milford Mill has been augmented by the addition of a converting department, primarily for the waxing, printing and embossing of glassine and sulphite paper, and at a separate plant

nearby many special lacquer-coated papers are produced.

Still under the able management of the Riegel family, the company has continued its leadership and is the largest manufacturer of glassine and greaseproof in the world as well as one of the largest makers of heavy duty specialty papers.

Benjamin D. Riegel, a grandson of the first John L. Riegel, is now Chairman of the Board of Directors, and the company's President is John Lawrence Riegel, who is also President of the American Paper & Pulp Association. The space of time between the first Riegel grist mill in 1823 and this present year of 1940 is too great to allow a very clear summary in a single page; but however briefly told it is a story of pioneer America, a small part of the reason for this country's greatness today and continued growth.



COMMUNITY HOUSE AT RIEGEL RIDGE



## Rhineland Paper Co., Rhineland, Wis.

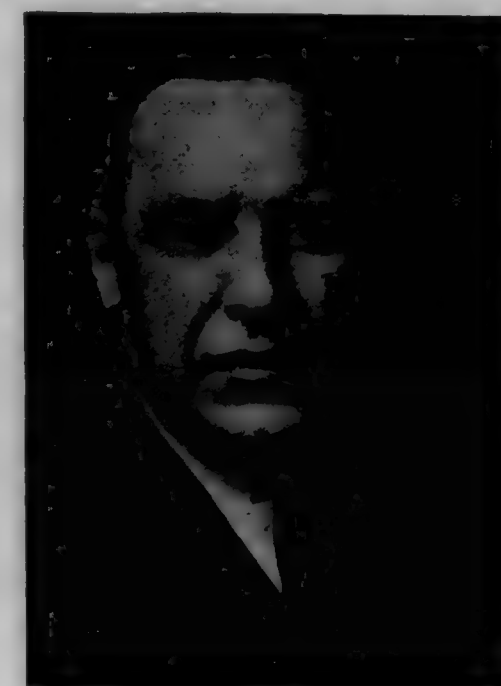
Back in the year 1882, a little pioneer settlement in the timberland of Northern Wisconsin became a small edition "boom" town when a short extension of rail was laid from the mainline to the isolated sawmill village. The three Brown brothers, pioneer owners of the sawmill, had prevailed upon a New York railroad capitalist, F. W. Rhineland, to sponsor the new transportation facilities, and in his honor the busy little metropolis was named Rhineland.

In 1903, "Andy" Brown, Dr. A. D. Daniels, Frank Robbins, Paul Browne, and several business associates, organized a paper company. Since Rhineland had become the accepted name of the thriving young city, it was adopted for use by the newly created paper making concern. Much credit is due these foresighted business men whose faith and vision was responsible for the firm's founding and early growth. From a meager beginning, the company has progressed to a position where today it is the largest self-contained glassine and greaseproof mill in the world.

Production is confined to the specialized manufacture of glassine and greaseproof papers for packaging and protected meats, shortenings, candy, bakery items, coffee, tea, and other food products. At present, the manufacturing plant consists of a completely modern paper mill and sulphite wood pulp plant, each having a daily capacity of over 65 tons. This capacity is being greatly augmented as cited later herein.

Twelve million gallons of filtered water are currently used in the paper making process. One hundred forty tons of coal are used in producing a part of the 130,000 kilowatt hours of electricity generated daily. The coal consumed and the electricity produced would heat and electrify a city of 30,000 population, while the filtered water used would satisfy the needs of a city several times that size.

The plant, located in one of the country's most healthful regions, comprises a number of modern factory buildings where working conditions are excellent. An expertly staffed modern research and control laboratory, recently housed in extensive new quarters, is constantly testing all paper produced.



FOLKE BECKER

Here, new products are being developed, and a wide variety of customers' paper problems are solved. When new developments occur within the industry, the Rhineland Paper Company is quick to adopt them into their plan of operations.

This paper mill is fortunate in its strategic location adjacent to raw material. Pioneer "Andy" Brown carved the Rhineland site and located the original paper company in the heart of a vast virgin forest. Throughout Wisconsin, Minnesota and Michigan, dozens of farmers annually harvest spruce trees which are marketed at the huge yards of the paper company. Also in Canada are extensive districts sending pulpwood by raft across Lake Superior where it is cured in the mills' yard. Some idea of the magnitude of these operations is evidenced by the fact that the Rhineland Paper Company uses more than 36,000 cords of wood each year. This curing process goes on for a period of a full year so that a constant year's supply is kept on hand in the mill yard at all times.

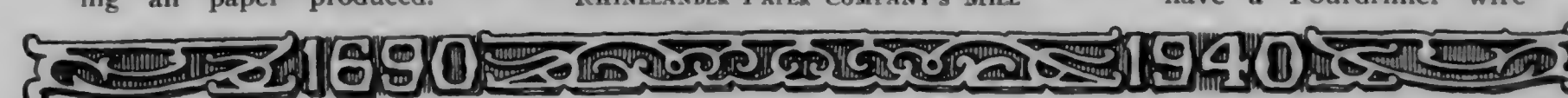
Work is rapidly progressing on the construction of additional office space to take care of the expanding needs of the main office of the Company. Following closely on the enlargement of administrative quarters, is the erection of extensive additional plant facilities required by the modernization program recently authorized by the directors of the Company. This program, conceived and developed by Folke Becker, President of the Company, calls for the expenditure of \$1,250,000 for buildings and equipment.

The work of modernizing will require about a year to complete, and will enable the plant to meet the ever-increasing competitive conditions in the paper industry. The expansion is in harmony with Rhineland's policy of maintaining preeminence in the field by employing new techniques in laboratory research, and in adding the most modern manufacturing facilities for efficient production.

The major step in the new set-up is, of course, the installation of a new machine for the manufacture of greaseproof and wadding specialty papers. The machine being constructed by the Beloit Iron Works will have a Fourdrinier wire



RHINELAND PAPER COMPANY'S MILL







182" in width, said to be the largest machine of its kind ever built to produce glassine and greaseproof paper.

Included in the plant expansion is a new beater room, machine room, and finishing room, together with new steam boilers to operate the additional equipment. Three new digesters are being installed to produce pulp for the large machine, and these are housed in an addition to the present digester room. The filtration plant is being enlarged to give greater output for the increased production reported to be approximately ten thousand tons annually.

Rhineland Paper Company is generally recognized as high up among the leaders in its field, and its leadership is attributed to foresight in making pro-

visions for progressive changes within the industry and to continuous research for, and production of, high quality and uniformity in its products.

Rhineland products enjoy a ready acceptance at home and abroad due in part to the company's continuous advertising and sales promotional activities featuring its unique quality and service.

To the paper trade of the world, the Rhineland brand has come to signify "consistently good"—consistently good American greaseproof and glassine paper products.

The present officers of the company are: President and Treasurer, Folke Becker; Vice-President, E. A. Forbes; Secretary, Paul Browne.

## Lee Paper Co., Vicksburg, Mich.

The Lee Paper Company was incorporated on July 16, 1903, at Vicksburg, Mich. and the first sheet of paper was made on May 31, 1905. The organizers elected July 20, 1903 were: Fred E. Lee, president; George E. Bardeen, vice-president; A. B. Gardner, vice-president; Norman Bardeen, secretary; Elbert S. Roos, treasurer; Charles H. Seitz, general manager, and William G. Howard, director and attorney. William H. Goodenough was General Superintendent. In the early years, the Company experienced considerable difficulty and there were many changes in operating personnel. Charles H. Seitz was succeeded as Manager in 1905 by O. H. Briggs, and in 1911 Briggs was succeeded by Norman Bardeen, under whose management the company's affairs were straightened out and successful operation begun. He continued as general manager and succeeded Fred E. Lee as president in 1931, retaining active management of the Company until his death in 1936.

Fred E. Lee, from whom the company derived its name, was president of the Round Oak Company, of Dowagiac, Michigan, and contributed heavily both to the founding of the company and also during the troubled early period when his financial stability and level headed sympathetic business judgment were sorely needed. A. B. Gardner was associated with him in Dowagiac in the stove business and gave the same generous support that was accorded by Mr. Lee. Both were active in the operation of the business in the role of director; Lee until 1936 and Gardner until 1939.

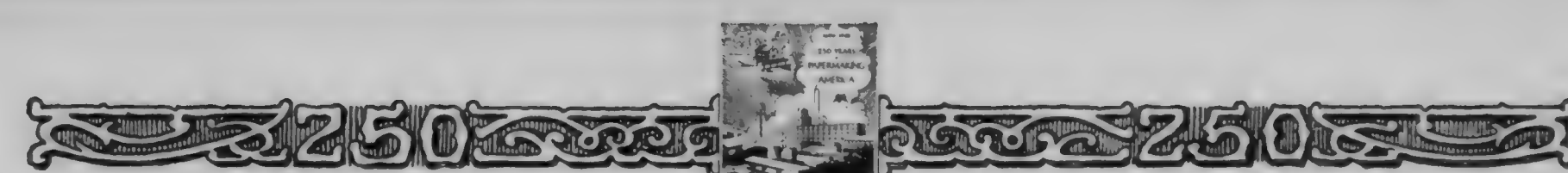
George Bardeen had been associated with the paper industry in the Kalamazoo Valley practically from its inception and was, at the time of organization of the Lee Paper Company and until his death, president and manager of the Bardeen Paper Company, of Otsego, and was one of the co-founders of

the Mac Sim Bar Paper Company. He remained as vice-president and member of the board of directors of the Lee Paper Company until his death in 1924. William G. Howard was a prominent Kalamazoo Lawyer who was attorney for the company and an active member of the board of directors until his death in 1906.

The present officers are: Maxwell D. Bardeen, who joined the company in 1926 as a chemist and became superintendent in 1932 and president and manager in 1936. The 1st vice-president is Harry C. Howard, prominent attorney of Kalamazoo and associated with the company for many years as attorney and director. He is a son of William G. Howard, one of the founders. The 2nd vice-president is R. D. Nugent, president of the Round Oak Furnace Company, of Dowagiac, and a nephew of Fred E. Lee. The secretary is Byron Bishop who joined the organization in 1906, became director in 1926, and secretary in 1931. W. J. Comstock has been with the company since 1907 and has been treasurer since 1936. He is also a member of the board of directors.

Other Directors of the Company at various times were W. H. Goodenough, W. J. Ustick, Samuel Folz, C. H. McKain, John A. Howard, John F. King, Bertrand Hopper, George D. Cobb, William H. Wightman, and Florence B. Anderson. The present board is made up of the officers and Merrill W. Taylor, vice-president of the First National Bank of Kalamazoo, and Woodbury Ransom, also of Kalamazoo.

A complete improvement program has been in progress for several years. New steam and electrical generating equipment has been installed, the paper machines have been rebuilt and the entire plant electrified. Extensive plans for further improvements are projected for the next several years.



## St. Regis Paper Co.—Taggart Corp.

The St. Regis Paper Company was incorporated in New York State in 1899. For the first twenty years the company manufactured newsprint in its plants in northern New York. Later, it developed lightweight catalog sheets and printing papers for directories and publications. In May, 1925, the St. Regis Paper Company merged with the Hanna Paper Corporation with plants located on the Racquette River at Norwood, Norfolk and Raymondville to become one of the largest manufacturers of sulphite and groundwood paper in the country.

The printing paper mills of the St. Regis Paper Company are located at Deferiet, Norfolk and Harrisville, N. Y. Its largest and most modern mill at Deferiet turns out a large tonnage of lightweight M. F. and Rotogravure for catalogs, directories and publications. Specializing in groundwood content papers for quantity runs, the Deferiet mill with its five machines manufactures Circulation M. F., Magazine Book, Standard Book, Rotowite, Rototone and Northland Catalog.

The two-machine mill at Norfolk makes printing and writing grades. The Harrisville mill manufactures Bulking, Drawing, Mimeograph, Bristol, Tag and Specialties. Harrisville also has two machines. The total capacity of these mills is upwards of 300 tons a day . . . the combined annual capacity being over 125,000 tons of paper. St. Regis also operates its own bleached and unbleached sulphite mill at Deferiet and an unbleached sulphite mill at Norfolk.

From the standpoint of raw materials, St. Regis is in a distinctly advantageous position. The St. Regis Paper Company, Ltd., of Canada, owns outright or holds cutting rights on 213,000 acres in Quebec. St.

Regis also owns 150,000 acres of timberland in the Adirondacks and 335,000 acres of timber in northern New Hampshire and Vermont.

St. Regis owns the Norwood & St. Lawrence Railroad which operates from Norwood, N. Y. and connects with the Rutland Railroad and the New York Central. It has a terminal at Waddington, N. Y., on the St. Lawrence River, transporting shipments of wood and manufactured products to plants at Norfolk, Norwood, Raymondville and Chase Mills.

The company owns a large kraft pulp mill located in Tacoma, Wash. which was acquired in 1930. The Tacoma mill is a modern pulp mill having a capacity of more than 225 tons of bleached and unbleached sulphate pulp per day.

In February, 1929, St. Regis acquired the entire assets of the Bates Valve Bag Corporation. This company originated and developed the famous Bates Multi-wall Valve Bag and filling machines for packing cement, lime, plaster and other rock products. The plants of the Bates Valve

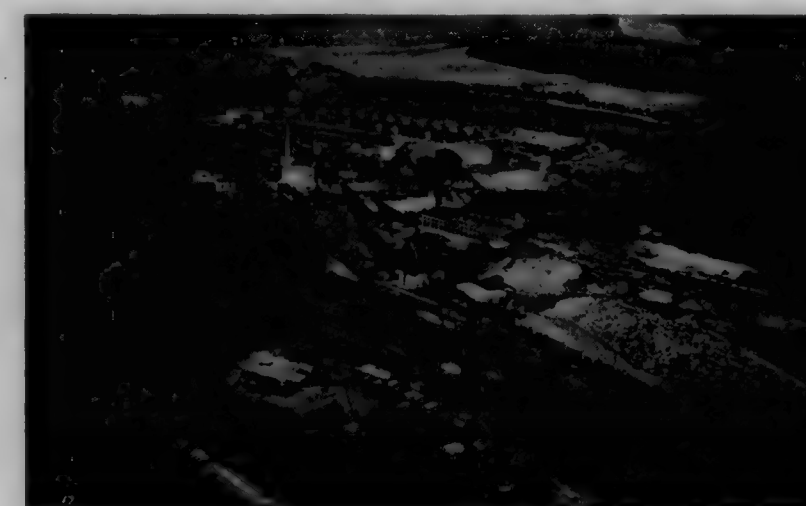
Bag Corporation are located at Nazareth, Pa., New Orleans, La., Los Angeles, Cal., Emeryville, Cal., Seattle, Wash. and The Valve Bag Company (subsidiary) at Toledo, Ohio.

At Oswego, N. Y., St. Regis operates a complete engineering and machine division for the manufacture of valve bag filling machines, bag making machinery, clutches and wire ties. This, combined with the field engineering division, enables St. Regis to render a complete packaging service.

The company sells filling machines, machine parts, wire ties, etc. throughout the world and manufac-



R. K. FERGUSON



DEFERIET MILL OF ST. REGIS PAPER CO.



OSWEGO PAPER AND BAG PLANT OF TAGGART CORP.







tures multiwall paper bags through license arrangements in thirty-six countries.

The Panelyte Division of the St. Regis Paper Company is located in Trenton, N. J. manufacturing Panelyte, a laminated Bakelite used for refrigerator insulation and radio construction. Since 1925 this division has pioneered in the laminated plastic field. Panelyte became affiliated with St. Regis in 1929 and since that date its production has annually risen with the general increase in the plastic industry.

## Bird & Son, East Walpole, Mass.

Bird & Son was established in 1795 at Needham, Mass. Since that date four generations of the Bird family have conducted the business. The first of these four generations was represented by George Bird, who was born in Union, Maine, and at an early age came to Milton, Massachusetts. In 1795 he purchased waterpower and built a paper mill in Needham. That was the starting point of the business of Bird & Son.

George Bird sold his Needham mill in 1803 and leased a mill in Dedham, Massachusetts. In 1817 he purchased water power rights and land on the Neponset River in Walpole, and the business now carried on by Bird & Son has been located on this land since that time.

Francis William Bird, son of George Bird, was born in Dedham, October 22, 1809. On April 1, 1834, he purchased the business then owned by his brother, Josiah W. Bird, who had succeeded George Bird. Four years later he acquired the property known as the "Neponset Paper Company," in Walpole, from Jabez Coney, Jr.

He then formed a partnership with his father, George Bird, his brother, Josiah, and his brother-in-law, doing business under the name of George Bird & Son. After the dissolution of this firm, the business was owned and managed by F. W. Bird, under the name of F. W. Bird.

In 1871, Francis W. Bird, Jr., eldest son of Francis W. Bird, came into the business. He died in 1874. Charles Sumner Bird, second son of Francis W. Bird, entered the business in 1877. Soon afterwards he was admitted a partner and the firm name became F. W. Bird & Son.

On August 22, 1880, the paper mills were destroyed by fire. They were immediately rebuilt and enlarged.

Francis William Bird died May 22, 1894. The business was then purchased by Charles Sumner Bird, and was carried on by him without partners until January, 1913.

A plant was built in 1904 in the town of Norwood, just over the Walpole line, for the manufacture of roofing and waterproof papers. A year later a mill was built in Hamilton, Ontario, Canada, for the manufacture of roofing papers similar to those made in Norwood, Massachusetts.

In 1928 the Taggart Bros. Company, later Taggart Corporation, with mills at Oswego, Watertown, Carthage and Herrings, N. Y., became affiliated with the St. Regis Paper Company. This company, founded in 1866, manufactures specification kraft, coated rope stock and kraft papers for bag manufacturing. Taggart Corporation is one of the country's large producers of kraft paper, multiwall paper bags and flour sacks.

The Phillipsdale, R. I. mill, where felt paper used in the roofing and floor covering products is manufactured, was built in June, 1907. In November, 1908, a paper mill for the manufacture of felt paper to be used at the Hamilton mill was purchased from the Montreal Paper Company at Pont Rouge, Canada.

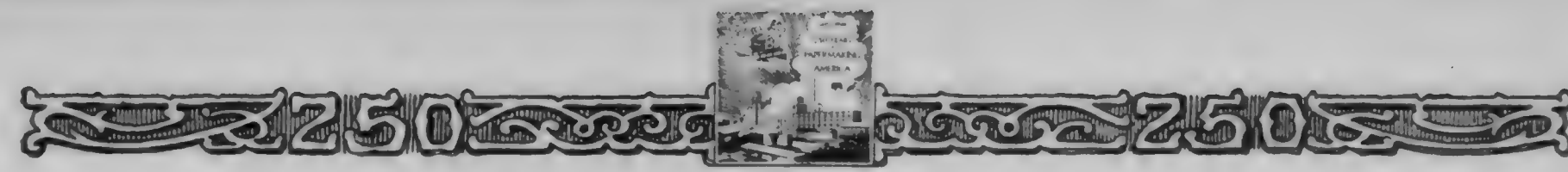
In 1911 there was still a further enlargement of the business, when another plant was built in Norwood, adjacent to the roofing plant, for the manufacture of floor covering. On January 1, 1913, a partnership was formed by Charles Sumner Bird, Philip R. Allen and Charles Bird, Jr., under the name of Bird & Son. Soon after the declaration of the World War in 1914, Mr. Bird, Jr., volunteered and served in the army until the end of the war. On November 1, 1917, the plant of the West Coast Roofing Company, located in Chicago, Illinois, was purchased for the manufacture of roofing and waterproof papers.

In April, 1918, Charles S. Bird's elder son, Francis William Bird, came into the business. He died of pneumonia in August 1918. Francis William Bird, in East Walpole, was dedicated to his memory upon completion in 1927.

The firm of Bird & Son was incorporated on May 10, 1918, with Charles Sumner Bird as president. He served nine years until his death on October 9, 1927. At his death Philip R. Allen was elected president, holding the office a little over seven years, until January 7, 1935. On that date Mr. Allen retired as president, but retained the office of chairman of the board of directors, Benjamin H. Roberts was elected president and Charles Sumner Bird, Jr., who had been a member of the board of directors since its incorporation, was elected vice-chairman.

The associated company, Building Products, Ltd., of Canada, has also expanded greatly in the last few years. To the plants at Hamilton and Pont Rouge were added one at Montreal and one at Portneuf, Quebec in 1926, and in 1934 a new plant was acquired at Winnipeg, Manitoba. The main office of the Canadian firm is at Montreal.

Early in 1935, Bird & Son, Inc., purchased the Berry Asphalt Company of Waterloo, Ark. The property includes an asphalt refinery and the lease of nearly forty oil wells.



## New York & Pennsylvania Co., Lock Haven, Pa.

In this nation of ours, vastly rich in natural resources, straws blown by an unexpected wind have changed the lifelong careers of many men. In the case of Colonel Augustus G. Paine it was not a question of straws, but poplar chips.

Colonel Paine was born in Maine. Some time after finishing his education in Portsmouth and Portland he came to New York to become the junior partner of a drygoods commission firm, Harding, Colby & Paine. The firm was successful, but Colonel Paine did not

confine his energies to its affairs. He was interested in banking, and especially in the promotion of new inventions. Many of these proved expensive, but that did not check his enthusiasm.

By chance he became acquainted with a young man, R. H. Emerson, of Jackson, Michigan, who was working to improve the process of extracting cellulose from poplar wood for use in the manufacture of paper. This process originated in Austria but had not reached a practical stage. Several American paper companies were experimenting with this process, among them S. D. Warren & Company and The American Wood Paper Company. The last named company was the most successful and for a time, although the cost of their product was high, operated at a profit, as the growing demand for paper exceeded the raw material supply—rags and old papers.

Colonel Paine raised and furnished sufficient funds to erect a soda fiber mill at Jackson, Michigan. It was a small mill, with a capacity of 5 to 7 tons a day, and while it was an experimental plant, it oper-

ated for several years at a substantial profit. The location, however, was not suitable, and the plant was finally abandoned.

In the year 1881 a soda fiber mill was built at Willsboro, Essex County, New York. The plant was crude and not operated efficiently. The largest stockholder in the company was a friend of Colonel Paine's and induced him to loan the company a substantial sum of money, taking a mortgage on the plant as security. Result: Colonel Paine woke up one morning

and found he owned the mill and was obliged to take over its management. His son, Augustus G. Paine, Jr., then 19 years of age, had returned from Europe where he was completing his education. Colonel Paine sent him to Willsboro, and also his nephew Alvah Jordan, who is now President of the Everett Pulp & Paper Company of

Everett, Washington, to see what they could do to put this plant on its feet. Colonel Paine and these two young men rebuilt the plant, introducing many improvements, among which was multiple effect evaporation used in the recovery of soda from waste liquors. In short, the improvements made at this comparatively small mill revolutionized the industry, and the Champlain Fiber Company became most profitable.

This induced Colonel Paine to become interested in other paper and pulp companies. In 1899 Oliver H. Paine, Augustus G. Paine and Garrett Schenck organized the Great Northern Paper Company at Millinocket, Maine, for the manufacture of newsprint paper. Colonel Paine acquired interests in other paper



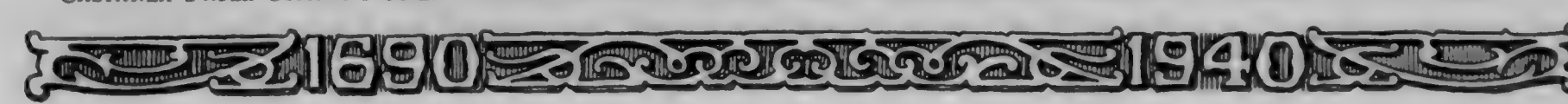
COL. A. G. PAINE

AUGUSTUS G. PAINE

EUSTIS PAINE



CASTANEA PAPER COMPANY MILL AT LEFT AND THAT OF NEW YORK & PENNSYLVANIA COMPANY IS SHOWN AT THE RIGHT







plants through the country. The Champlain Fiber Company at Willsboro, the Lock Haven Pulp & Paper Company at Lock Haven, Pennsylvania, and the Clarion Pulp & Paper Company at Johnsonburg, Pennsylvania, were controlled by three families, the Armstrong brothers of Lock Haven, the Wetherills of Chester, Pennsylvania, and the Paines of New York. With a view to economy in management, and to avoid conflicting interests, it was decided to combine these three institutions, and with that purpose in view the New York & Pennsylvania Company was incorporated in 1890. Colonel Augustus G. Paine was elected President, and retained that position until his death in 1915 when he was succeeded by his son, Augustus G. Paine, Jr.

In 1920 the New York & Pennsylvania Company, in conjunction with Crocker, Burbank & Company

## The Glassine Paper Co., West Conshohocken, Pa.

The Glassine Paper Company was established in 1910 at West Conshohocken, Pa. It represents 20th century youth in the industry. Comparatively little background in years but a rich background of pioneering in a new field of the industry, a field that has emerged through the short span of years an integral part of the great industry.

The manufacture of GLASSINE, a product in its infancy in this country at the beginning of the 20th Century, began in The Glassine Paper Company's Valley Forge Mills in 1910 under the ownership of The Diamond State Fibre Company and has been manufactured there continuously since that time. In 1925 The Glassine Paper Company was formed by a group of men interested in the possibilities and the development of this new paper with the result that with the help of these foresighted men this branch of the industry shows the greatest development from the years, 1925 to 1940. These same men, with a few exceptions, are still the officers of the company and recognized leaders in this branch of the paper industry. They are, Charles B. Fritz, president; Robert F. Nelson, vice-president and general manager; and George T. Fritz, secretary-treasurer.

Glassine paper, once a specialty, is now widely used as a transparent wrapping of everything from foodstuffs to oiled machine parts. It is air, germ, grease and, when waxed, moisture resisting. In addition it is, in the standard grades, sufficiently transparent to display attractively the articles packaged. Retaining all of the original characteristics of the sheet, Glassine is now manufactured with super transparency that competes with Cellophane and on

of Fitchburg, Massachusetts, and The Curtis Publishing Company of Philadelphia, formed the Castanea Paper Company, and erected a 150 ton paper mill at Lock Haven, Pennsylvania. These two corporations were, and are still, under the same management, and have together a daily capacity of 350 tons of soda and sulphite pulps and 600 tons of high grade book and specialty papers.

Most of the chemicals used—caustic soda, bleach and fillers—are manufactured at the plants. The companies own large tracts of woodlands which are estimated to yield a perpetual supply; also valuable coal deposits adjacent to the mills. Augustus G. Paine, Jr., after many years of service retired in 1935 as President and was succeeded by his son, George Eustis Paine, who is now serving as President of the New York & Pennsylvania Company and the Castanea Paper Company.

the other hand can be opaqued, as well as produced in practically any color desired. It is converted into every conceivable type of bag, envelope and wrap for the packaging of so many nationally known products it would be impossible to list them; also it is now the indispensable liner of cartons, bags, etc., in which are packaged products such as coffee and cereals.

The Glassine Paper Company created and perfected the now widely used laminated Glassine, trade name Paraval and Parabag and consisting of two sheets of Glassine laminated together with specially prepared waxes and wax-resins. It is a dual sheet in characteristics as well as in make-up, insofar as it not only affords protection against grease penetration but affords as high resistance to moisture-vapor penetration as any sheet of this nature on the market today. Laminated Glassine is essential for the proper packaging of foodstuffs that are easily rendered unsalable due to atmospheric changes.

Expansion of The Glassine Paper Company was imperative by 1939 and the company purchased the plant and interests of the McDowell Paper Mills in Manayunk. The McDowell Paper Mills, owned and operated by the McDowell family for 114, years manufactured many types of paper but also pioneered in the manufacture of GLASSINE and assisted materially in the development of the new paper. The Glassine Paper Company acknowledges Charles McDowell, the owner of the McDowell Paper Mills from 1888 to 1939, as a great paper maker and is justly proud to carry on the fine tradition of the McDowell family in the paper industry.



## Bulkley, Dunton & Co., New York

In 1833 the business grown into the present Bulkley, Dunton & Company was initiated by Jeremiah L. Cross at 234 Pearl Street in New York City; first as a stationery store, then as a commission paper warehouse and, in 1838, as a co-partnership with Edwin Bulkley and Hiram N. Gookin under the style of Cross, Bulkley & Gookin. Eight years later the name changed to Bulkley & Gookin when Jeremiah Cross withdrew to start up in business at 240 Pearl Street in partnership with Louis Bulkley, Edwin's brother, under the style of Cross, Bulkley & Company. In 1848 Hiram Gookin withdrew from Bulkley & Gookin, Louis consolidated his interests with those of his brother and under the firm style of Bulkley & Bro. they took quarters at 110 John Street.

### Buy Bancroft Mill

A marked tendency toward industrial development began to manifest itself in 1854 when the Bulkley brothers became interested in manufacturing through the purchase of the Bancroft Mill at Middlefield, Massachusetts. In 1858, their organization considerably expanded under the name of Bulkley Brother & Co., they built the Union Mill at Middlefield to meet the demands for their output of hanging paper and manila for envelopes turned out by both Middlefield plants.

### Unchanged for Seventy-five Years

William C. Dunton, a natural born salesman, was among the men in the enlarged organization and the force of his personality and ability makes itself evident by the 1865 alteration of the firm name to Bulkley, Dunton & Company which has remained unchanged for seventy-five years. Over a span of twenty-three years during which the American paper industry saw its great period of development Edwin Bulkley conducted broad-scale activity particularly throughout New England and where he promoted or otherwise became the main force in underwriting the building of one paper mill after another and providing ready and profitable outlets for their production.

### New Partners Enter Firm

David G. Garabrant and Andrew Bulkley, Edwin's elder son, were taken into the firm in 1876; Moses Bulkley, the second son, joined in 1879 and in 1880 Edwin's younger son, Jonathan, was admitted. Edwin Bulkley died in 1881 after forty-three years as a conspicuous figure in the building of America's paper empire.

The history of Bulkley, Dunton & Company is remarkable for the degree of flexibility with which they anticipated impending changes or drifts and adjusted operations accordingly. At one

time newsprint was a major item and when the newsprint line slanted in other directions the company put its main effort on book papers and major changes and innovations of production and marketing are evident even within this classification.

### Pulp Department Organized

In 1891 the business was transferred to 75-77 Duane Street where it remained for forty-five years and in 1936 the executive offices were moved to the present building at 295 Madison Avenue and a warehouse at 32 Varrick Street acquired for paper stocks.

A pulp importing department, organized in 1912 to handle foreign wood pulp, is now under the management of Fred Enders. In 1926 agency arrangements were made for domestic pulps in the belief that before long this would be depended upon as a major source of supply. When the European war broke out thirteen years later this foresight became highly significant.

### Other Departments

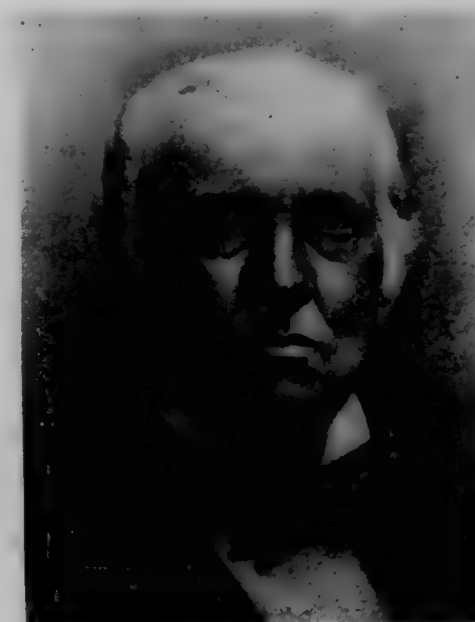
A paper merchandising department added in 1933 is under the direction of E. S. Sickles, selling printing papers in the New York metropolitan area. At the same time a technical department was organized whose first offering was a revolutionary patented method of paper sizing which provided improved brightness, lower acidity and lower costs while increasing sizing efficiency. This led to the organization of the American Bewoid Company. The patented Sween

method for improved wire retention of fiber and filler was later brought to the attention of the paper manufacturers. Thousands of tons of paper are now made with this process because of improved finish and quality. The technical department is also making a major contribution to the conservation of natural resources through a comprehensive study of water problems. Stream pollution is materially reduced through the application of white water clarification methods which they have developed.

### The Surviving Partners

When Jonathan Bulkley passed away in 1939, his son J. O. Bulkley, and Franklyn Stone were the surviving partners. In 1940 an export company was formed headed by George G.

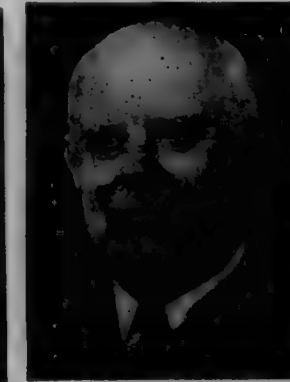
Cobean, formerly vice-president of the Butler Paper Company of Chicago with Fred Enders, vice-president, and J. O. Bulkley, treas. Fred Enders is president of the Bulkley, Dunton Pulp Co., Inc., and J. O. Bulkley is treasurer.



EDWIN BULKLEY



DAVID G. GARABRANT



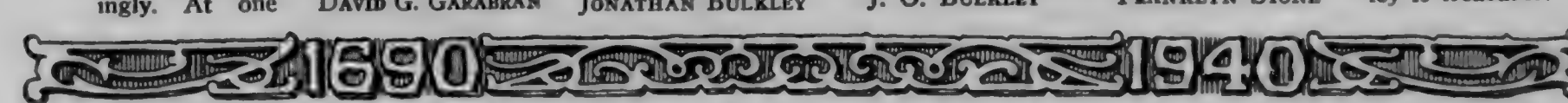
JONATHAN BULKLEY



J. O. BULKLEY



FRANKLYN STONE





## Gottesman & Co., Inc., New York

Established 1886, Gottesman & Company, Inc., serves some of the foremost pulp and paper manufacturers in the world through its offices and direct agencies in important sections of North and South America and Europe, does a nation-wide business in wood pulp among American paper makers and maintains world-wide export and import trade in this essential basic commodity.

During its fifty-four years the efforts of the company have been directed solely toward the service of the one industry. Executive, sales and commercial departments occupy three floors at 22 East 40th street, New York City; European head office is at Birger Jarlsgatan 8, Stockholm, Sweden; direct agencies are maintained in Buenos Aires, Rio de Janeiro, Sao Paulo, Havana and London.

Five officers have been with the organization for an average of thirty years and this long service has enabled them to build extensive friendships throughout the world of paper and pulp as well as to acquire expert knowledge of the industry's problems. These five officers are: D. Samuel Gottesman, President; Arthur J. Sigel, Vice President; Benjamin I. Sheldon, Treasurer; B. Emanuel, Secretary.

Among the many mills for whose pulp products Gottesman & Company is selling agent are: Southern Kraft Corporation, subsidiary of International Paper Company, manufacturers of bleached and unbleached kraft pulp, with mills at Bastrop and Springhill, La., Georgetown, S. C., Panama City, Fla., Moss Point, Miss., Mobile, Ala. and Camden, Ark.; Eastern Corporation, manufacturers of bleached and unbleached sulphite and dissolving pulps for paper and rayon manufacturers, with mills at South Brewer, Lincoln and Orono, Maine; Gaylord Container Corporation,

manufacturers of kraft pulp at Bogalusa, La.; Hawley Pulp and Paper Company, manufacturers of unbleached sulphite at Oregon City, Ore.; St. Lawrence Paper Mills Company, Ltd., makers of dry unbleached sulphite and dry ground wood, with mills at Three Rivers, Quebec, Canada; Lake St. John Power and Paper Company, Ltd., producers of moist unbleached sulphite and moist ground wood at Dolbeau, Quebec, Canada.

The Gottesman organization has pioneered in the importation of what have become some of the most essential grades of wood pulp. Foremost among these is kraft pulp, of which they brought in the first shiploads in the early days of the production of this quality in Scandinavia. They also pioneered in the introduction of wood pulp for the manufacture of artificial silk—shipping silk pulp from Scandinavia to the original English and American producers of the product now known as rayon.

Prior to the cessation of shipments from Europe they were the selling agent in the United States for numerous Scandinavian and Continental European wood pulp mills, including: Dynas Aktiebolag; Hylte Bruks Aktiebolag; Aktiebolaget Iggesunds Bruk; Konga Aktiebolag; Munksjo Aktiebolag; A/S Saugsbrugsforeningen; Svano Aktiebolag; Wifstavarfs Aktiebolag; Wikmanshytte Bruks Aktiebolag.

The commodities handled by the Gottesman company are bleached sulphite, easy bleaching sulphite, strong unbleached sulphite, bleached kraft, easy bleaching kraft, strong kraft, Mitscherlich pulps, quick cook pulps, wet and dry ground wood, bleached soda pulp, domestic and imported pulps of every kind and heavy chemicals for the paper industry, especially salt cake.

## Hollingsworth & Vose, East Walpole, Mass.

The Hollingsworth & Vose Company was established early in the 19th century at West Groton, Mass., through the purchase and development of a paper mill by Lyman Hollingsworth, a son of Mark Hollingsworth, whose offspring were so instrumental in building up the paper industry of New England. This mill was located at West Groton, Mass., and was acquired in the early nineteenth century. This became the present West Groton plant of the Hollingsworth & Vose Company. In those days, when the manufacture of paper was a finely skilled handcraft, the rope and jute paper produced by the West Groton Mill of Lyman Hollingsworth was a standard of its time. This consisted principally

of tag and pattern papers, papers for sanding and for various wrapping purposes, and was sold throughout New England, and even prior to the days of the Civil War was known and used in foreign markets. Its high reputation the logical successors of the company have held to this day, and the famous strong papers of Hollingsworth & Vose Company of the present generation need no introduction to the paper trade of the country.

In 1843 we record a great achievement in paper manufacture in the discovery of the possibilities in manila fibre made by the Hollingsworth brothers, John Mark, and Lyman. A patent was issued to them by the United States Patent Office in 1843.

In 1871 Zachary T. Hollingsworth, a nephew of the West Groton mill operator and a son of Amor Hollingsworth of Tileston & Hollingsworth, in whose mill he learned paper making, purchased the so-called Kennedy mill in East Walpole, Mass., from Francis W. Bird. This mill site was purchased in 1812 by Mr. George Bird, a paper maker, who came from Union, Maine, in 1795. He purchased the property from James Richardson, Josiah Daniel, and Eliphalet Baker, subsequently building the dam and paper mill. This was the first paper mill built in Walpole on the Neponset River, the product at that time being newspaper. In 1817 the business was continued by Mr. Bird and his son, Josiah N. Bird, under the firm name of Bird & Son. In 1871, Mr. Bird sold the property to Mr. Hollingsworth. The mill at this time contained a 48 inch machine with an output of about 2,000 lbs. a day. On September 22nd, 1873, the mill was destroyed by fire. The owner at once rebuilt it, replacing the old machine with a 62 inch cylinder machine made by Rice, Barton & Fales.

In 1875 Mr. Charles Vose entered Mr. Hollingsworth's employ as salesman. Mr. Vose had, since 1867, been employed as salesman by the wholesale paper house of B. H. Thayer & Company who were the selling agents for Mr. Lyman Hollingsworth for his West Groton and Bridgewater mill products. In 1881 Mr. Vose became an equal partner under the firm name of Hollingsworth & Vose.

The business of the company having rapidly increased, it was found necessary to increase the output and in 1881 the firm purchased from Lyman Hollingsworth his West Groton Mill, making rope

manila papers. This contained one 56 inch Fourdrinier machine with a daily capacity of 6,000 lbs. During the following years the mill changed hands several times, until in the year 1846 it was burned, before which time it had been re-possessed.

In 1918 Louis E. Vose, a son of Charles Vose, who in 1898, after leaving college, had come to work in the East Walpole mill and had been since 1899 superintendent of that mill, was made manufacturing manager for both mills.

A change in the organization of the company took place when, in 1921, Z. T. Hollingsworth and Charles Vose retiring as president and vice-president respectively, and their sons, Valentine Hollingsworth and Louis E. Vose, taking their places, Robert W. Lennox was elected treasurer and purchasing agent and Thomas Compton Walsh was made sales manager, all of whom hold their respective offices at the present time. Z. T. Hollingsworth died April 1st, 1925. For several years he had practically been in retirement, although continuing to act as chairman of the board of directors. Charles Vose was active up to the time of his retirement, having, since the company's incorporation, had the managing of sales as well as the general supervision of manufacturing until the latter duties were taken over by his son in 1918, and continuing in charge of the sales until 1921. Charles Vose died January 15, 1933.

In 1929 a new 120 inch 3-cylinder machine was installed at the East Walpole mill to replace the 56 inch cylinder machine to take care of increased business. It was necessary in 1935 to add another cylinder to the machine so that a more diversified line of papers could be manufactured.

## Sharp Paper & Specialty Co., Inc., New York

The Sharp Paper and Specialty Co., Inc., of New York City was established in 1923 by Bernard Sharp formerly President of the Great Eastern Paper Company. Mr. Sharp's record in the paper industry goes back to 1912 and since 1916 he has been active in the exporting of paper and paper products.

Originally located at Two Hundred Fifth Avenue the Sharp organization moved to the present offices at 220 Fifth Avenue some eight years ago.

In the seventeen years since 1923 the Sharp Paper and Specialty Company has established branches and offices in twenty-five foreign countries.

From 1923 to late in 1939 there was little of especial significance in



BERNARD SHARP

the way of spectacular change in the exporting of American papers, whereas during the year 1940 the trend has been toward local converting in a number of important foreign markets.

The export outlook appears favorable in late 1940 to Bernard Sharp who has built up the small organization he founded into a business which has won recognition among American mills and the business men in many parts of the world. The export outlook is favorable, that is, provided exporters are ready to adapt themselves to the customs and temperaments of the people they are serving abroad, ready to study and respect the unusual laws and regulations, methods and habits of the foreign customer.





## Strathmore Paper Co.

Strathmore Paper Company, from its beginning in 1892, has expanded into one of the largest rag content paper mills in the country; its production increased 1500% from the original output of three tons daily; never deviating from the objective to "manufacture a line of printing papers that would be unique by reason of their quality and adaptability to the needs of the printing trade."

The story of Strathmore's beginning is told by Horace A. Moses, founder and president: "In 1882 I left the farm in Ticonderoga, New York, and came to Mittineague to work for the Agawam Paper Company. I was office boy, shipping and billing clerk, paymaster and book-keeper all in one. . . . In 1892 I took out the first shovelful of dirt that started the Mittineague Paper Company. About thirty years ago it was merged with the Woronoco Paper Company and the name changed to Strathmore Paper Company."

Since 1900 Strathmore papers have been used by foreign governments for paper money; by U. S. Post Office Department for money order forms; U. S. Government printed War Saving Certificate Folders on it during World War I; U. S. Navy used it for charts; British Government uses it for Navicerts during World War II; throughout the world it is used by industrialists for stationery, by advertisers for direct mail solicitation, by publishers for permanent and high grade editions, by artists for sketching and painting; greeting cards are printed on it; American and foreign construction projects are blueprinted on it; educational institutions send graduates into all phases of life with diplomas on Strathmore papers. Manufacturing one of the world's widest range of papers, Strathmore production now includes: bonds, books, bristol boards, writings, box covers, blue prints, covers, specialties, artist papers.

The making of these papers has been achieved by the addition of new machines and the modernizing of older ones. Starting with one paper machine in 1892, Strathmore added No. 2 machine in 1896, followed by the erection of No. 2 mill and the installation of No. 3 machine in 1901. The No. 1 mill at Woronoco was acquired with its two machines in 1905, and in 1912 the No. 2 mill housing one machine was built. These paper machines are of both the fourdrinier and cylinder type and the company has one machine imported from Switzerland for the production of unique specialty papers.

Much machinery and equipment now in use in the mills was developed by Strathmore engineering department or by their chemistry and physics laboratories. Among significant developments is a high-speed beater, the first of its kind to be used in an American paper mill. Electric eyes, original control and regulating devices, safety stops and recording instruments have been devised or adapted to raise precision to the highest possible standard with maximum operating safety.

In 1939 the Woronoco mills won first award in Massachusetts; in 1940 the National Safety Council gave them a perfect record award and for the same period they received the E. B. Fritz trophy for first place among the country's paper mills.

Strathmore's expansion and modernization program is reflected in the acquisition of substantial interests in the Old Colony Envelope Company of Westfield, Massachusetts, and the Rising Paper Company of Housatonic.

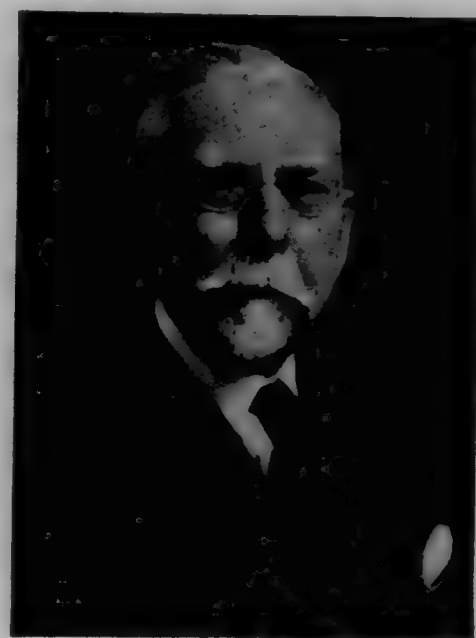
Domestic and foreign markets have been expanded by the introduction of a new line of printing papers—Strathmore Style Papers.

Some of the former planning upon which the growth of Strathmore has been built can be attributed to former officers who have since passed away. Willis H. Sanburn, Justus C. Sanburn, and Benjamin A. Franklin have left their time-honored imprint on this history.

Willis H. Sanburn entered the employ of the old Mittineague Paper Company in 1893 as bookkeeper and through indefatigable energy intelligently applied to the business he loved equipped himself with a thorough knowledge of fine paper making and eventually assumed charge of all manufacturing and other mill operations. In addition he became a director of the company and served as its treasurer. In January 1925 he passed away leaving a heritage of practices and policies destined to long survive his span of life.

Justus C. Sanburn, his son, selected to organize the first Strathmore laboratory immediately following his graduation from the Massachusetts Institute of Technology in 1912, became the company's first chemist and later its technical director and in later years served on the board of directors and as clerk of the corporation. In January of 1939 he died at the early age of forty-nine.

Colonel Benjamin A. Franklin, a partner in the industrial engineering firm of Miller, Franklin Company, joined Strathmore in 1910, serving as vice-president until his resignation



HORACE A. MOSES



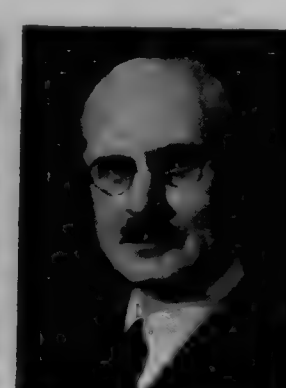
J. D. ZINK



C. M. BRYAN



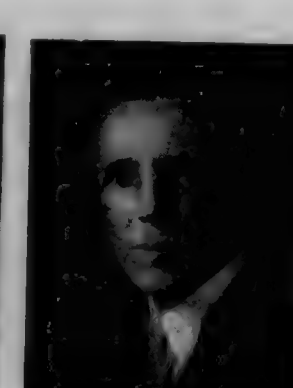
G. E. WILLIAMSON



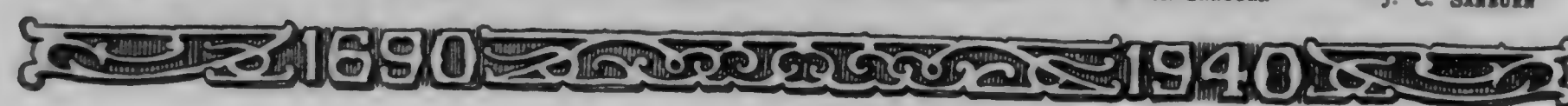
A. E. SHATTUCK



W. H. SANBURN



J. C. SANBURN



in 1932. During those twenty-two years he had charge of sales, advertising and cost accounting; an outstanding personality in the paper industry and at one time president of the Writing Paper Manufacturers Association.

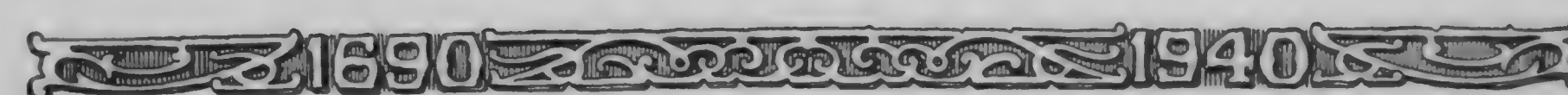
In late 1940 Strathmore has over 600 employees under the direction of Horace A. Moses, president; John D. Zink, first vice-president in charge of sales; Cassius M. Bryan, vice-

president in charge of manufacturing; George E. Williamson, treasurer; Arthur E. Shattuck, assistant treasurer and manager of supply; F. Nelson Bridgman, assistant treasurer; Cy Norton, sales promotion manager; Harry E. Riggs, advertising manager; Roy F. Arnold, in charge of product development; Thomas H. Parkhill, Lawrence W. Shattuck, Harold A. Bolles, superintendents; George R. Wholean, chief engineer; P. P. Gooding, technical director.

## The Northwest Paper Co.



NORTHWEST PAPER CO. MILLS AT CLOQUET, MINN.







EARLY RAILWAYS . . . PENNSYLVANIA, 1835

**W**HEN the Beckett Paper Company began to make papers of the text grade in 1848 there was no railroad in Hamilton and we transported our papers by wagon and canal.

William Beckett, the founder, once stood at the station in Baltimore and talked to Daniel Webster, who was inspecting a train such as that shown above, standing on rails of wood topped with strap iron. Webster remarked that the day was not distant when all-metal rails would be used and that railroads would span the continent. They did in 1869.

The Beckett mill has seen many papers come and go, but text papers have continued to be the choice of those who wish superior printing. With their interesting surfaces and elegant deckle edges they give character to printed work not obtained on any other paper.

**THE BECKETT PAPER COMPANY . . . Hamilton, Ohio**  
Makers of Good Paper Since 1848

For a generation now we have studied the possibilities of text papers in the modern world, with the result that we have provided for the trade three grades of text paper, varying in price from the moderate to the very low. They are:

**BUCKEYE TEXT . . .** A rag content deckle edge stock of great distinction, in white, natural and ivory.

**BECKETT TEXT . . .** Still lower in cost, beautiful and easy to print. Made in white, india and five colors.

**TWEED TEXT . . .** With tweed-mark surface, in book paper price class, but superior in appearance. In white, ivory, and four colors.

You can improve the quality of your output by specifying these papers, obtainable in all the centers of America through Buckeye and Beckett distributors.

# THE CHESAPEAKE CORPORATION

West Point, Virginia

*Manufacturers of*

FOURDRINIER  
KRAFT LINER

and

.009 KRAFT CORRUGATING  
MATERIAL

•  
KRAFT SPECIALTIES



# THE CHILlicoTHE PAPER COMPANY

CHILlicoTHE, OHIO

*Manufacturers of highest quality uncoated book papers.*

Specializing in making  
Offset Paper in plain  
and Fancy Finishes

Adena Offset—made,  
packed and shipped  
under completely con-  
trolled moisture condi-  
tions

Chillotints-Surface Decorated Paper

# Consolidated Water Power & Paper Co.

*Owner of Four Modern Paper Mills all in Wisconsin*



## Producers of Fine Paper Products

Manufacturers of those famous coated book papers—Production Gloss Coated, Modern Gloss Coated, Production Coated E. F., and Lakeland Coated—and form, mimeograph, groundwood specialties, hanger, regular and opaque bleached and unbleached lightweight Mitscherlich specialties, M. G. waxing, creping tissue, embossing, semi-crepe, bleached and unbleached Mitscherlich sulphite fibre.

MAIN OFFICES  
WISCONSIN RAPIDS, WISCONSIN

SALES OFFICES  
135 SO. LaSALLE ST., CHICAGO



**CROWN ZELLERBACH CORPORATION**

343 SANSOME STREET  
SAN FRANCISCO



**DEERFIELD'S GLASSINES**

*The Answer To Food Package Problems*

DEERFIELD'S GLASSINES are transparent, non-porous papers which do not allow the passage of air or the food enemies carried by air. Oxygen, the agent of rancidity, and germs, agents of mold and fermentation as well as disease, cannot pass through these protective wrappers. Flavors and other volatile ingredients cannot escape.

DEERFIELD'S GLASSINES are also grease-proof and, when coated with wax or other coatings, are highly moisture resistant and thus protect the freshness of their contents.

**DEERFIELD GLASSINE COMPANY**

MONROE BRIDGE, MASSACHUSETTS



# BARKER BROTHERS CLOSED

## FAMOUS BROKERAGE FIRM GOES UNDER AS RESULT OF FINANCIAL PANIC

Few people will remember that headline, carried by most of the newspapers throughout the country, for it appeared fifty years ago on November 20, 1890. It is well remembered by Dan Baker, however, for it was on that day that Dan started work on his first job. The job was with the P. H. Glatfelter Co., paper manufacturers, Spring Grove, Pa. Dan was 15 years old. Six years later he cast his first vote for President of the United States — fruitlessly for William Jennings Bryan — and subsequently voted in every election which brought McKinley, Roosevelt, Taft, Wilson, Harding, Coolidge, Hoover, and Roosevelt to the White House. He watched street cars come and go, first replacing horse-drawn cars and then being replaced by busses.

Since Dan first entered the paper mill, the United States has admitted Arizona, Idaho, New Mexico, Oklahoma, Utah, and Wyoming to the Union, and has fought in the Spanish American and World Wars. Revolutionizing inventions have been made, among them, the automobile, washing machine, airplane, radio, television, air conditioning and electrical refrigeration, oil burning furnaces and Diesel engines.

For the past 35 years Dan has been Superintendent of the Beater rooms at the Glatfelter Mills and now joins the Employees' Fifty Year Club bringing the membership to eight, who have an unbroken record of fifty years employment. There is also a Quarter Century Club with forty-five members, which is twenty-four percent of all those employed twenty-five years ago.

Though the changes and new developments that occur from year to year may be important and exciting, we like to believe that persistent quality and steady performance are just as important. To achieve them, nothing can replace constant and loyal employment.

P. H. Glatfelter Co.,  
Spring Grove, Pa.

# GREAT NORTHERN PAPER COMPANY

MILLS AT

MILLINOCKET, EAST MILLINOCKET

AND

MADISON, MAINE

NEWSPRINT

SULPHITE and GROUNDWOOD SPECIALTIES

SCREENINGS WRAPPER

SALES OFFICE

342 MADISON AVE., NEW YORK, N. Y.





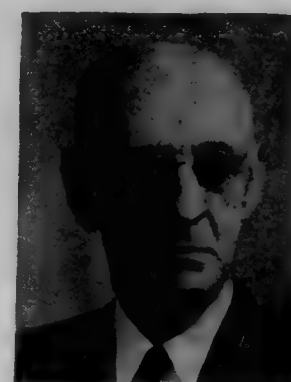
H. H. Yoder  
Vice President  
Employee Relations



H. D. Warner  
Secretary-  
Treasurer



Mildred W. Warner  
(Mrs. H. D. Warner)  
President



F. M. Dickinson  
Vice President  
Sales



W. E. Penfield  
Vice President  
Manufacturing

## GULF STATES PAPER CORPORATION = E-Z OPENER BAG COMPANY

TUSCALOOSA . . ALABAMA

**Paper Bags — Wrapping Paper — Butchers Paper**

— Sold only through Jobbers for more than 50 years —

QUALITY

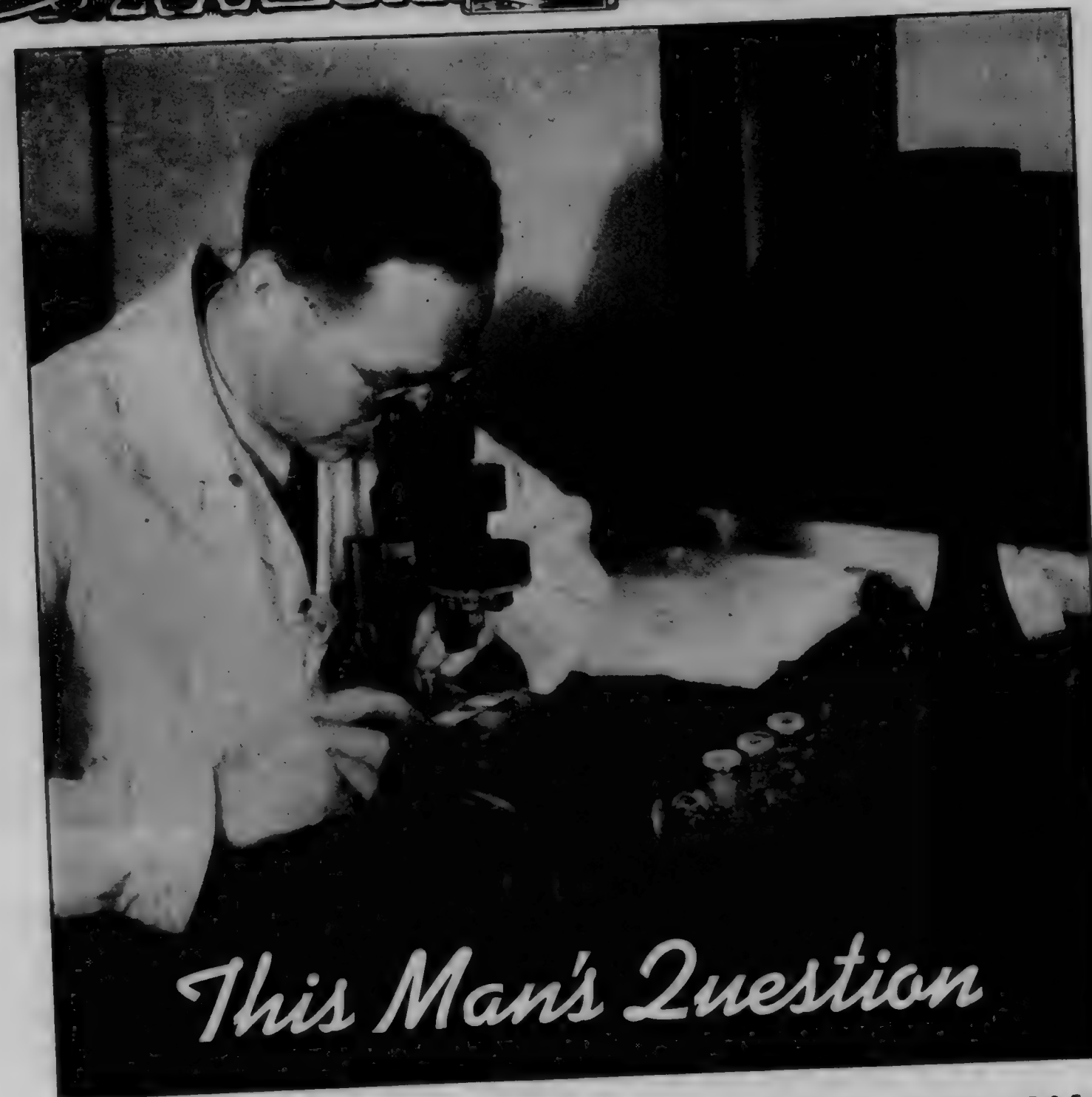


Trade Mark Reg.

COUNTS

Quality is never an accident. It is always the result of high intention, sincere effort, intelligent direction, and skillful execution. It represents the wise choice of many alternatives and the cumulative experience of many craftsmen. It marks the achievement of an ideal after necessity has been satisfied.

TUSCALOOSA MILL



## NEVER STAYS ANSWERED

"How can we make Hammermill papers better?" Every minute, every hour, every day, that's the question in the minds of the men on the research staff of the Hammermill Laboratories.

These men, scientifically trained, conduct a constant search for better methods, better materials. Their goal is always to find ways to manufacture papers that will serve printer and user with the greatest satisfaction.

But when they do find the answer to a particular problem, the question remains, for no standard, no method, no formula, no equipment, is ever considered "final" at Hammermill.

HAMMERMILL PAPER COMPANY • ERIE, PENNSYLVANIA





## They had to have IDEAS in order to make paper

A lot of paper has been made in 250 years. Much—perhaps most—of it wouldn't have been made had it not been for . . . IDEAS.

For instance, J. J. Hinde and J. J. Dauch, two Ohio farm boys who had pooled their resources to buy a threshing machine and a straw baler, had the idea that a fluted or corrugated straw paper would make an excellent protective wrapping for lamp chimneys, glasses, and bottles. It did. They started manufacturing the Climax Wrapper in a \$25-a-month paper mill at Sandusky, Ohio . . . and U. S. paper production went up.

Later, this same company (a little bigger, a little stronger) experimented with "corrugated boxes" for freight shipment. They worked. Their idea greatly expanded the usefulness of paper . . . and U. S. paper production went up.

Came the era of color-conscious buyers, and The Hinde & Dauch Paper Co. had big ideas about color printing. The ideas became realities . . . and U. S. paper production went up.

Today, with 16 box factories and 10 paper mills located throughout the U. S. and Canada; with the best known Package Laboratory in the world; with 52 years of experience guiding its thinking—The Hinde & Dauch Paper Company developed ideas like the DUPLEX, a patented combination shipping-display box . . . SELMOR floor display stands of corrugated board . . . COLORBOARD in a wide range of stock patterns and colors . . . and U. S. paper production went up.

The important thing about all this is that every idea brought profit to some user of paper or paper products. Let H & D show you a profit making idea.

**Better See H & D** AUTHORITY  
ON PACKAGING

HINDE & DAUCH • Executive Offices, 4052 Decatur St., SANDUSKY, OHIO  
Factories in Principal Cities • Canadian Address: Toronto, Ontario

## We Salute

the paper industry on the 250th Anniversary of paper making in the United States.

We salute it with new strength and new determination — as expressed in our new Chickasaw Mills at Mobile, Alabama — which embody the most modern ideas and developments in paper mill layout and construction.

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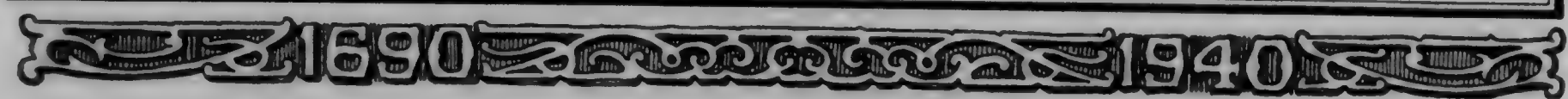
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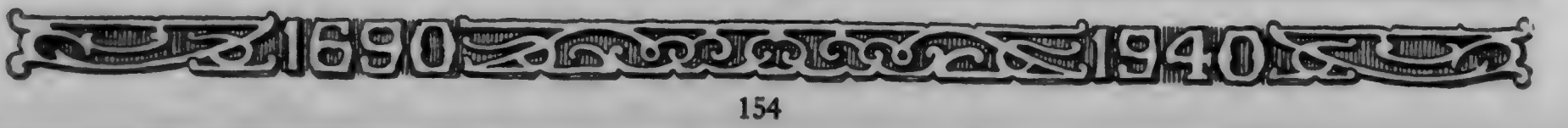
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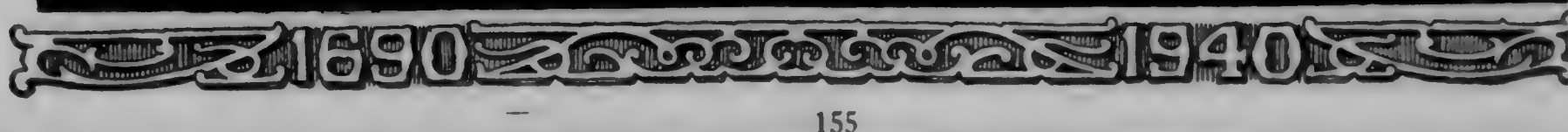
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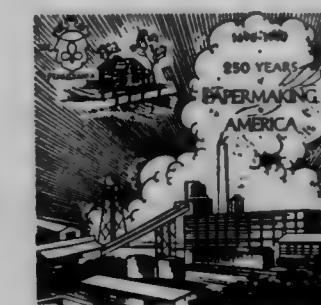
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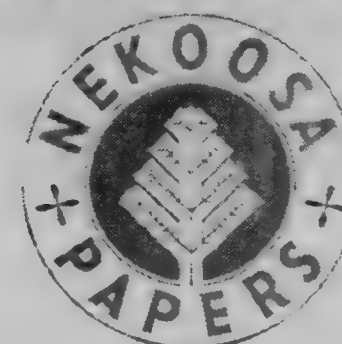
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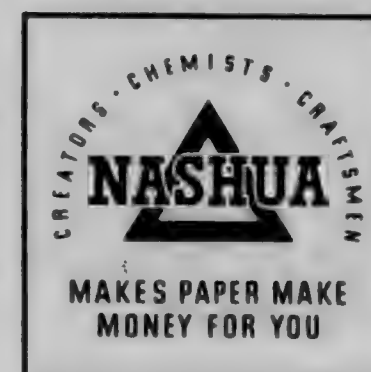
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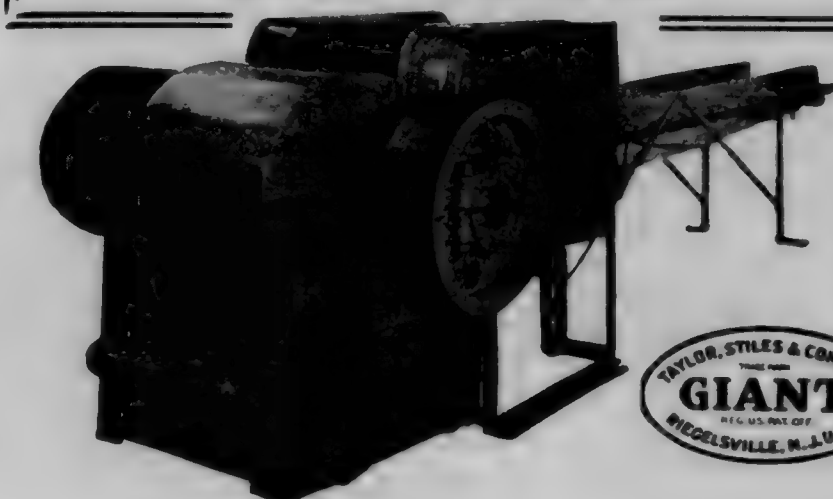
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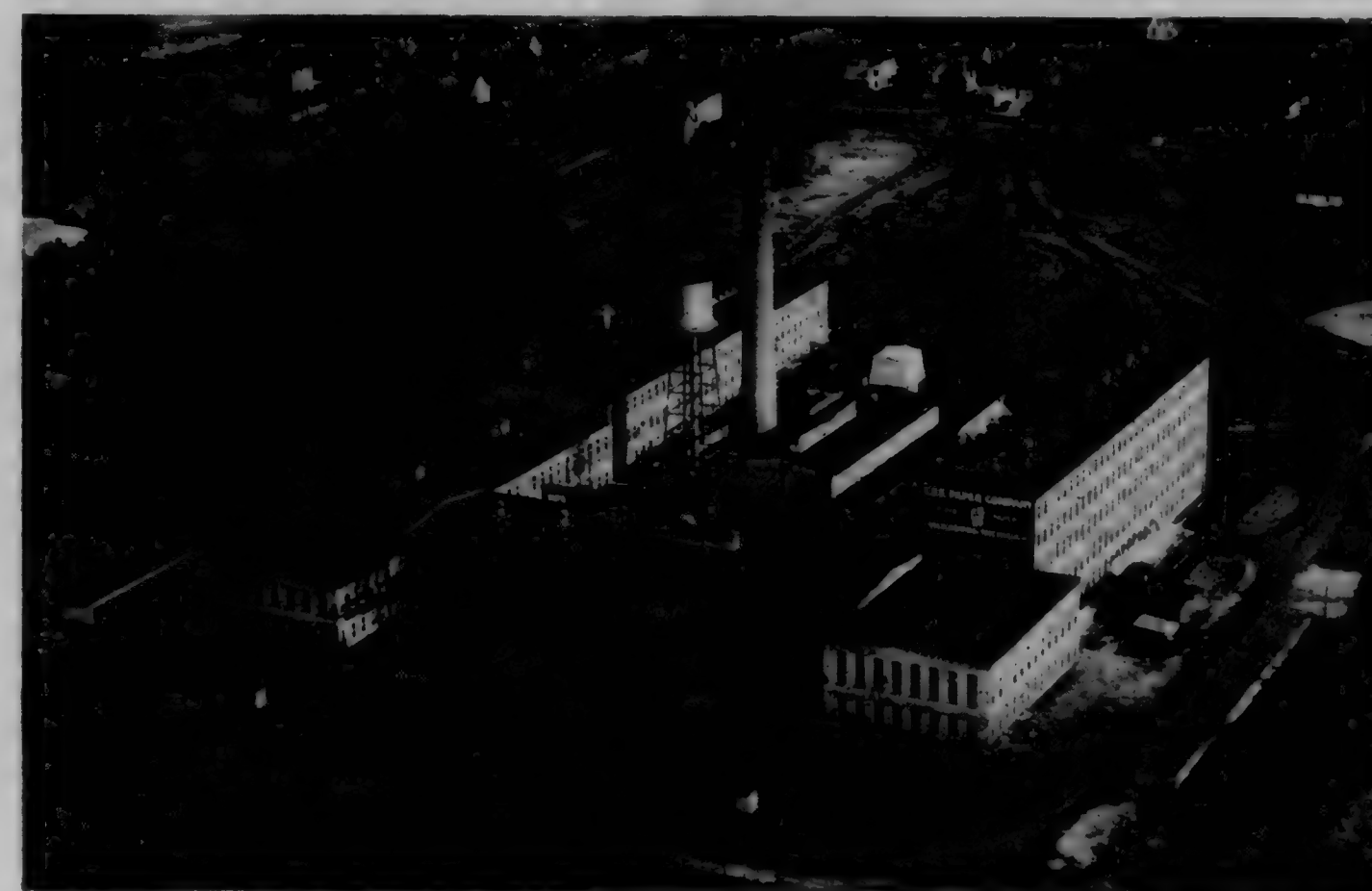
## ATLANTIC BOND

For your business stationery  
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A Watermarked Mill Brand Product

## EASTERN CORPORATION

BANGOR, MAINE

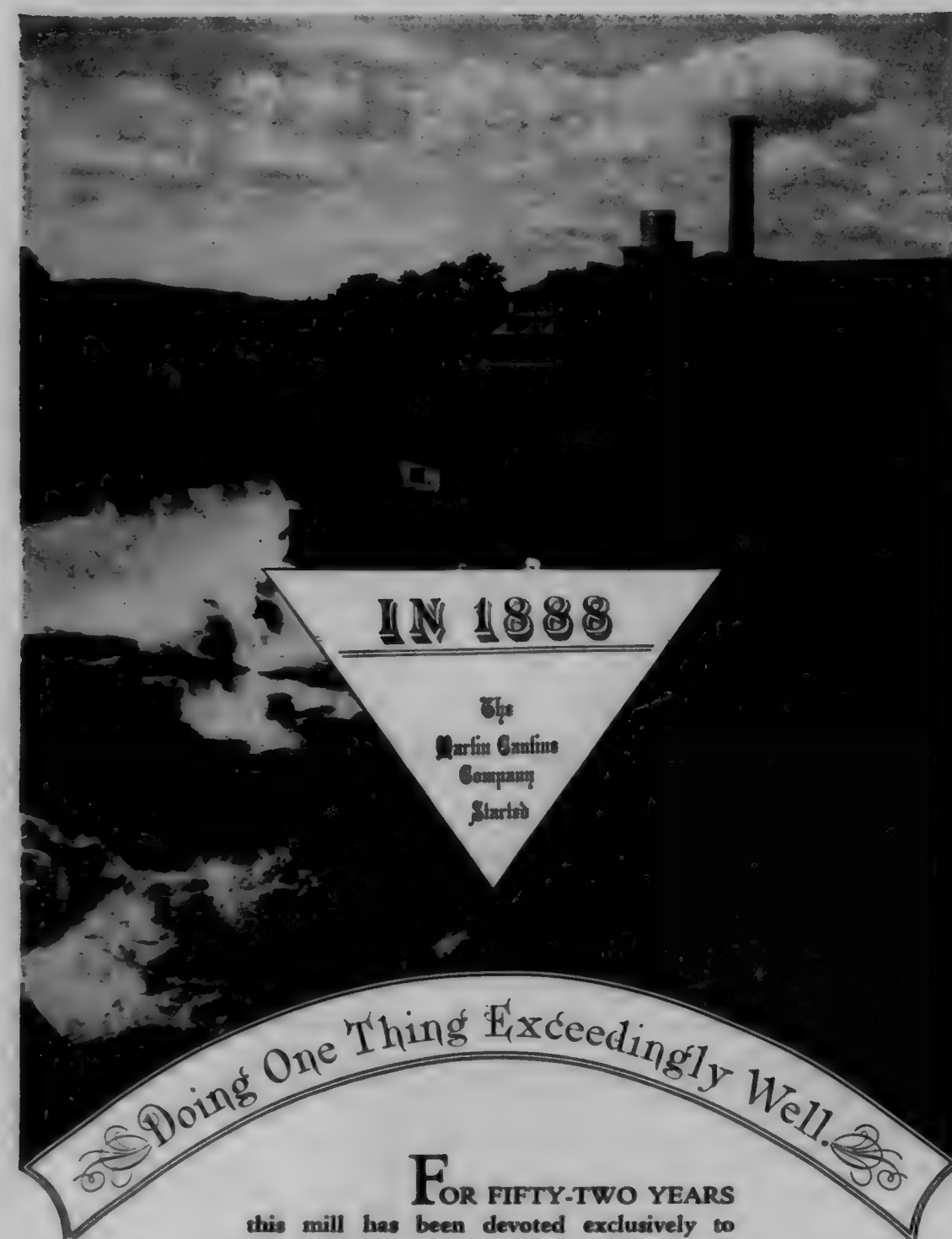


RAG  
AND  
HIGH-  
GRADE  
SULPHITE  
BONDS,  
LEDGERS,  
TECHNICAL  
PAPERS  
AND  
SPECIALTIES

### LEE PAPER COMPANY

VICKSBURG, MICHIGAN





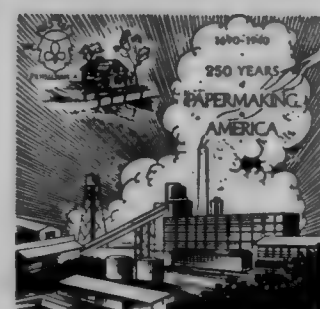
**IN 1888**  
The  
Martin Cantine  
Company  
Started

**FOR FIFTY-TWO YEARS**  
this mill has been devoted exclusively to  
the development and manufacture of coated  
papers. We take this occasion to thank the  
many paper merchants, printing craftsmen  
and others who have collaborated with us.

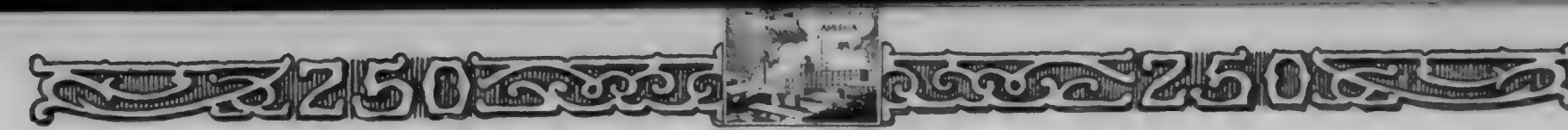
**Cantine's** THE MARTIN CANTINE CO., SAUGERTIES, NEW YORK  
SPECIALISTS IN COATED PAPER FOR FIFTY YEARS  
**COATED PAPERS**



**PAPER MANUFACTURERS COMPANY**  
Sch & Willow Sts. Philadelphia, Pa.



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HISTORICAL  
RECORD OF  
**250 YEARS OF  
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IN AMERICA**  
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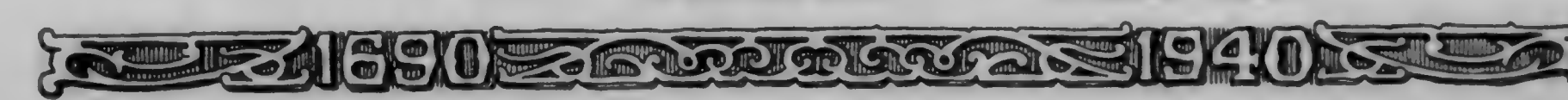
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250 250

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PULP CO., INC. 295 Madison Avenue  
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Wood Pulp  
and  
Paper



Bewoid  
Rosin  
Size

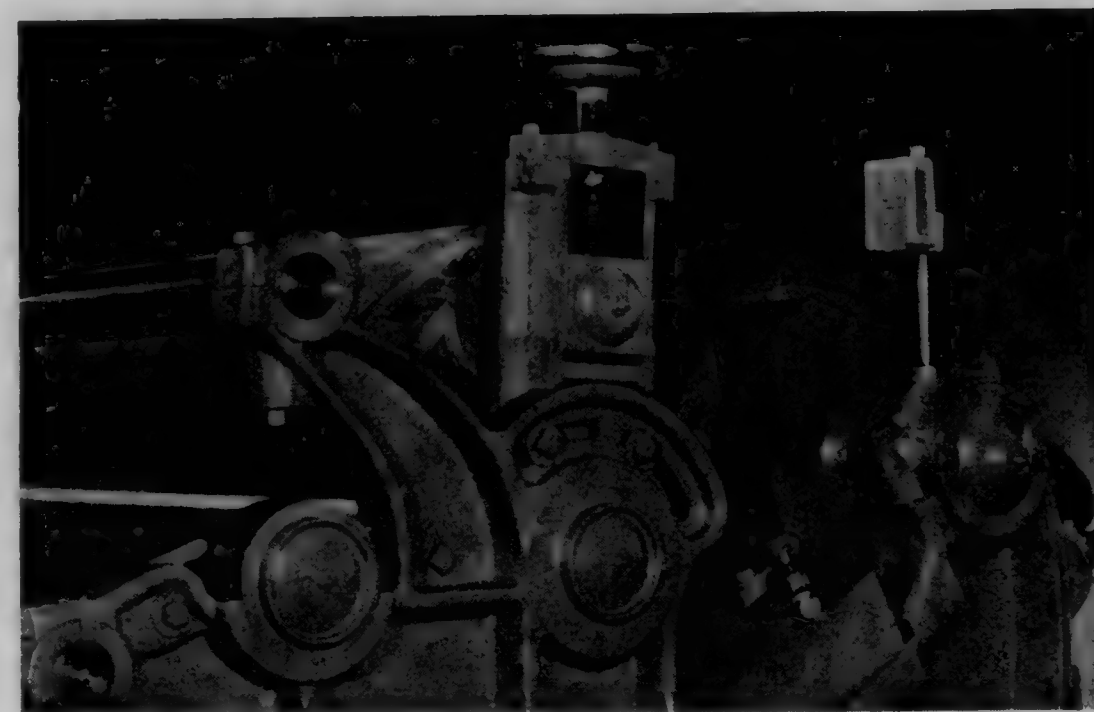
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1690 1940

250 250

## EXPERIENCE



### PRECISION and SPEED

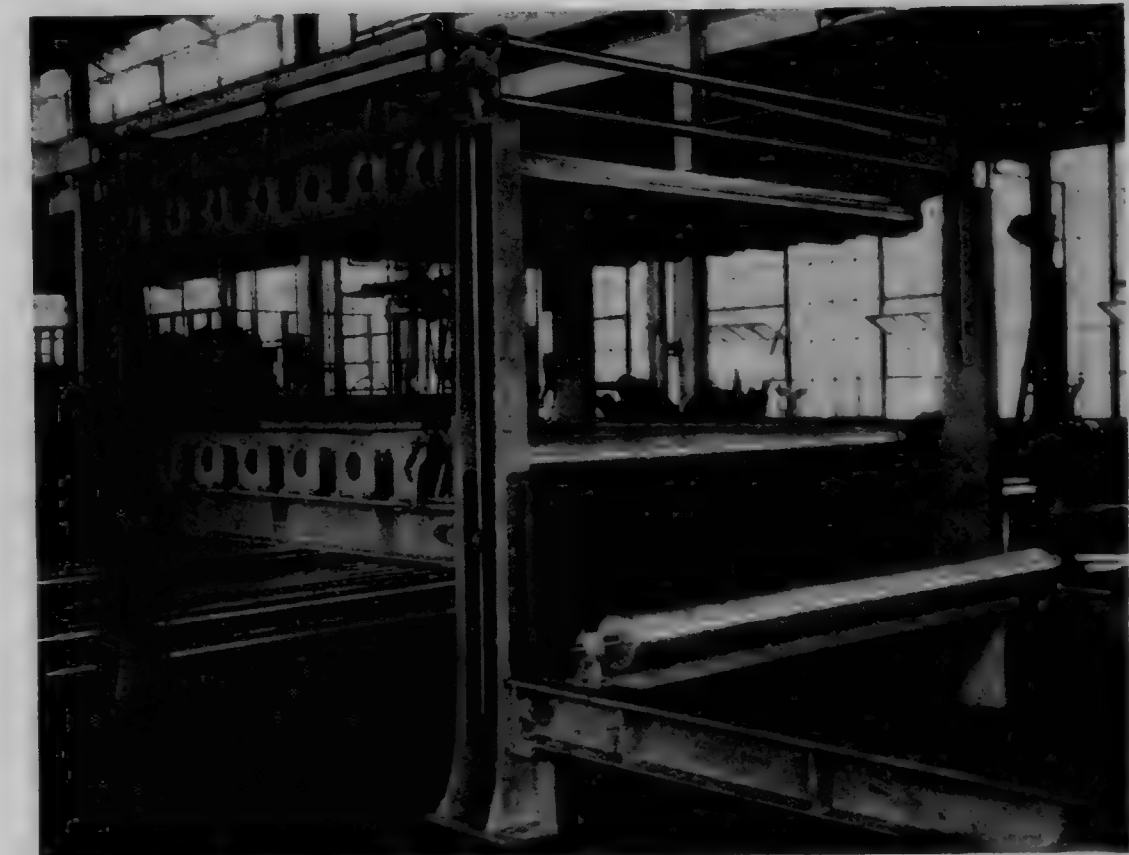
New Clark-Aiken Fast Cutter is now operating in five of the best known bond paper, coated paper and printing plants.

Developed out of experience extending back to 1893 it is setting new standards of precision and speed wherever it is being used.

### MODERNIZING SIZE DRYING

New Clark-Aiken Dry Loft now operating in 10 outstanding fine paper mills.

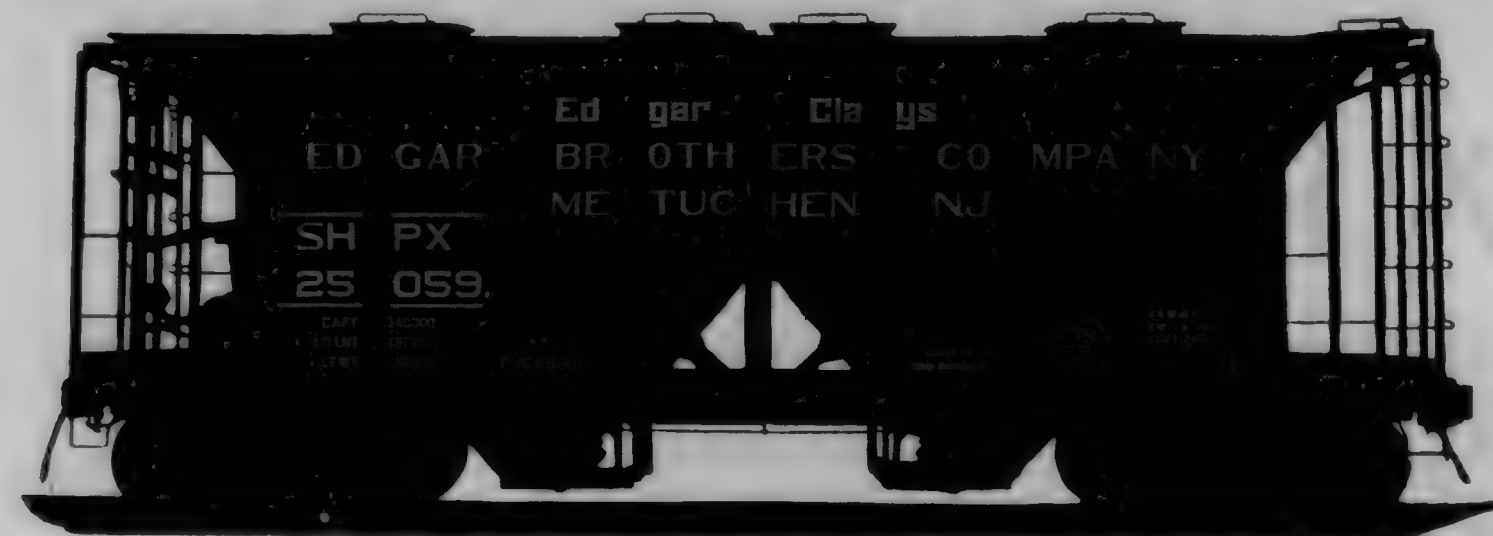
Advanced design incorporates automatic control, electric drive and anti-friction bearings throughout. This loft modernizes the drying of sized papers. Its acknowledged leadership is the result of pioneering development in this field since 1919.



THE CLARK-AIKEN COMPANY  
MAKING GOOD MACHINERY FOR PAPER MILLS SINCE 1828  
LEE MASSACHUSETTS

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## ANOTHER HISTORY MAKING ADVANCE IN CLAY PROGRESS

With the new type, Edgar tank car, the unloading of 40 to 50 tons of clay now takes approximately one hour.

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## Historical Record Of 250 Years of Paper Making in America

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*GOTTESMAN & COMPANY, Incorporated, are:*

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		Georgetown, South Carolina
Eastern Corporation,	with mills at	South Brewer, Maine
		Lincoln, Maine
		Orono, Maine
Gaylord Container Corporation,	of	Bogalusa, Louisiana
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**During  
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Almost All  
New Mills Have  
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HOOPERWOOD  
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**Continuous Research and Improvement of  
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Since 1800

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## 3 RELATED INDUSTRIES celebrate their birthdays



### PRINTING—500 YEARS

It was about the year 1440 that Johann Gutenberg invented movable types and typographic printing—an achievement termed by Victor Hugo, "The greatest invention of history."



### THE AMERICAN PAPER INDUSTRY—250 YEARS

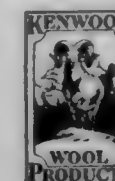
In 1690, William Rittenhouse, aided by William Bradford, a printer, of Philadelphia, established the first paper-mill in America.



### KENWOOD FELTS—70 YEARS

In 1870, at the beginning of the era of modern paper manufacture, F. C. Huyck began weaving paper-makers' felts in this mill by a waterfall at Rensselaerville, New York.

**T**HIS YEAR MARKS some mighty big birthdays in Paper and allied industries. Printers are celebrating their 500th Anniversary. The American Paper Industry is 250 years old. And F. C. Huyck & Sons complete their 70th year of service to the paper makers of this country. . . . Together, these three related industries can rejoice in paper's many contributions to better living. Proof of its importance is the fact that every year the average American uses 225 pounds of paper in its various forms—more than any other product



except water and milk. . . . As the world's largest manufacturers of paper-makers' felts, F. C. Huyck & Sons are proud to have had the opportunity to serve the paper industry during the period of its greatest growth and proud, also, of the many felt developments they have pioneered which have contributed to that growth. . . . Are you taking advantage of the free services of Huyck's field engineers and research department in solving your felt problems? They are available through the Huyck representative in your territory.



For 70 years F. C. Huyck & Sons have grown with the paper industry, and the small original mill has become the fine modern plant of Kenwood Mills at Albany.

**F. C. HUYCK & SONS**

ESTABLISHED 1870

**KENWOOD FELTS • ALBANY, N. Y.**





# PULP

**Perkins-Goodwin Co.**  
ESTABLISHED 1846  
**30 ROCKEFELLER PLAZA • NEW YORK**  
CHICAGO OFFICE: CHICAGO DAILY NEWS BLDG.

# PAPER



ENGINEER IN THIS BOX BOARD MILL SAYS HE  
**"never saw any other belts, either leather or  
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Using TANNATE to drive an Underliner Jordan and Filler Jordan, this engineer gives a considered opinion based on years of experience and a close observation of TANNATE's performance. Conclusion: TANNATE grips more surely, transmits power more efficiently and has greater capacity! It has long service life with little maintenance cost! TANNATE also increases production—and decreases unit costs! . . . Let us show you what the profit possibilities are for you.



STEP UP PRODUCTION  
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**RHOADS** *Tannate*

Founded  
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**WATERSHED LEATHER BELTING**

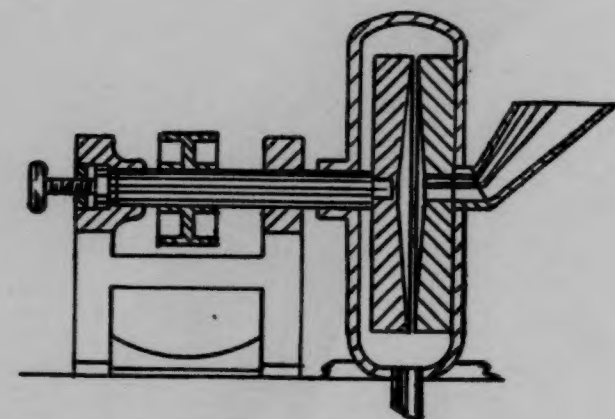
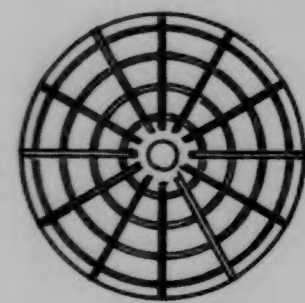
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# TIME MARCHES ON— SO DOES PROGRESS IN THE DESIGN OF MACHINERY FOR PULP PREPARATION

FOR IN 1882—



Burns' Mill Patented Feb. 14, 1882 — Patent No. 253,814

BACK EVEN BEFORE THE  
"GAY NINETIES"—

an inventor named Burns, conceived a "rotary-disk disintegrating machine for reducing the paper pulp" along with a process for the manufacture of paper.

Doomed to failure presumably by its obvious mechanical shortcomings, the Burns' mill somehow fell by the wayside and the idea of the disc mill for use in pulp preparation was nearly forgotten.

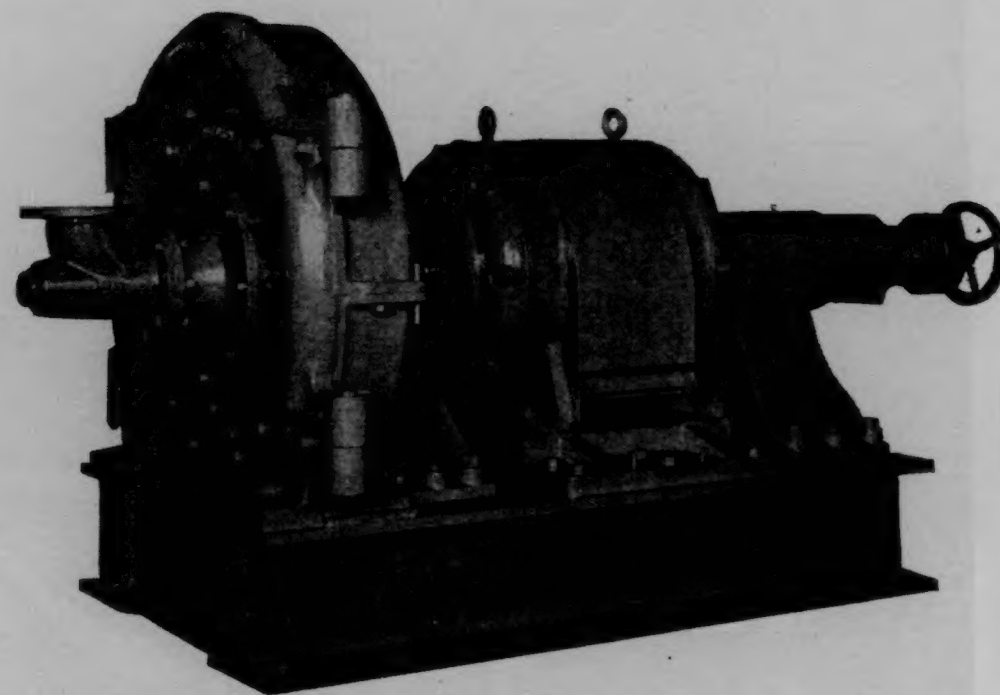
UNTIL 1940—

58 YEARS LATER—

When the Sprout-Waldron Type 36-1 Rotary Disc Mill was introduced to the trade as a money-saving, profit-producing machine for installation on Kraft, Soda and Sulphite Knotter rejects, on bull-screen rejects, on spent chips, on semi-chemical chips, etc.

The Type 36-1 incorporates all the experience of a concern which has been building reduction machinery for over 40 years; the benefit of intensive study on the part of highly skilled engineers assigned specifically to the problem; and the practical knowledge of its adaptability to pulp preparation gained by actual installations in the production lines of several modern mills.

May we send you our Bulletin 2200-P describing this mill and the work it can do for you?



Sprout-Waldron Rotary Disc Mill-Type 36-1

## SPROUT, WALDRON & CO., INC.

DESIGNERS • ENGINEERS • MANUFACTURERS

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